Telephony.

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The Business Outlook.

Regardless of the operations of the tariff adjusters at Washington, general business conditions throughout the country are reported to be unusually good. Gross earnings of the railroads in March showed a gain, and the government experts believe that the winter wheat outlook is most encouraging. Wall Street is somewhat in the dumps, as a number of the leading speculative stocks are "off," but out in the real United States, where live the people who are doing constructive work, the feeling is hopeful for a prosperous year. There is a good demand for manufactured products, and the opinion prevails that as soon as the new tariff is established the business of the country will readjust itself to changed economic conditions and proceed with probably a more substantial foundation than now exists.

If the 1913 crops are normal and if the tariff changes do not upset conditions more than they have so far, all will be well, for, when all is said and done, we all know that we live in the most favored country on the face of the globe and have little to fear.

The Danger of Getting Too Big.

Measured in inches, Goliath the giant made David, the shepherd boy, look puny and weak, yet the biblical account of the contest records that the stripling scored a knockout. Then, in the fashion of that early day, before Marquis of Queensberry's rules governed such encounters, David drew his sword and cut off Goliath's head, while the giant lay prone on the earth, too big and clumsy to get up or even roll over to avoid his smaller and more agile opponent. Abnormal size is often a detriment, for it carries with it an unwieldy sluggishness, if not positive stupidity. Such is the trouble with many of the great trusts.

Secretary of Commerce Redfield, in a recent address before the cotton manufacturers, said: "But are the economies of centralized organization more than balanced by certain economic weaknesses which do not arise in the smaller concerns? We know that many of the trusts have commercially failed. We know that others are not paying profits upon their securities at all commensurate with those earned by smaller private concerns. What the facts are precisely we do not know. They need to be exhaustively worked out, for we may come to find that the remorseless law of economics is working its way irrespective of legislation and the light of economic truth may make clear a way which to many has seemed rough and hazardous."

Commenting on this statement from the representative of the Wilson administration, Louis F. Post, the political economist, points out that trusts may be divided into three classes as follows: (1) Trusts that have no controlling special privilege; (2) trusts that have controlling special privileges which they have capitalized ("watered") beyond the present economic capacity of those privileges; and (3) trusts that have controlling special privileges, the economic capacity of which is not overvalued in their capitalization. Proceeding Mr. Post says: "The first kind of trust, the kind having no controlling privilege, is the kind that fails. This kind of trust is driven to the wall by the economic weaknesses of over-organization when it comes into competition with smaller and better-managed concerns, neither being equipped with any controlling privilege. The second kind of trust, the kind having controlling special privileges which are over-capitalized, is the kind that pays inadequate profits. But the third kind of trust, the kind that has controlling special privileges not over-valued in their capitalization, has its feet upon the earth, where Hercules had his when he conquered Antæus. This is the trust which does not fail and does pay fat profits."

In which class does the Bell telephone organization place itself? That the Bell is beginning to believe that it is too fat and bulky for its own good health has been apparent for some time. Water in the stock issues may be as dangerous to a corporation as too much water in the tissues of the human body. Both conditions tend to an unwholesome bloating, and make it comparatively easy for a smaller but more active competitor to gain the victory.

The Independent telephone company that handles its local enterprise capably need not worry that a foreign giant can defeat it in a fair fight—and the government has promised fair play in all such cases.

The Man Who Thinks He Has No Chance

By HERBERT KAUFMAN

The man who thinks he has no chance destroys his chances by acknowledgment of self-defeat. He has deliberately blinded himself: bound upon his limbs the shackles and chains of cowardice: weighted himself down with the greatest of all handicaps—despair. He has wrenched the knocker from his door: stuffed his ears with cotton wool and cannot hear Opportunity when she does summon him.

Life is a huge kaleidoscope, rotating upon the axis of time. Every day the earth takes a turn that readjusts the aspect of existence. Every hour reveals a new pattern for the future. Viewpoints are incessantly altering. New combinations of circumstances are putting novel phases upon affairs.

The highways and byways are shifting. The wastes of past centuries are awake and blossoming into fertile areas.

All over the world Industry is in a vast, seething ferment. From Shanghai to Lima the merchant is finding new openings for his wares. From London to Kobe the manufacturer is planning further markets for his products. From Assouan to Death Valley the engineer is battling the arid, burning clays and sands. The explorer is roaming from pole to pole for new fibres and new seeds and new timbers and new earths and new ores, upon which new industries will feed.

In a thousand laboratories the chemist is fitting his keys of research to the locked secrets of Nature, enriching art and science and commerce with wealth undreamed of by the dead ages.

The river is wearing a leash and, tied to the turbine, its waters are making light and giving power to busy wheels for miles around. A new empire for man's possession has been conquered by the aeronaut.

The ever-hungry reaper and harvester are gnawing grain and grass where once were Bad Lands—crying to the railroads to follow them—monster needles with iron rails for thread, stitching fruitful textures to cover the bared body of the Earth.

You nor your children's children can, within the total span of your lives, take advantage of all the chances which a single decade has disclosed.

Never in all the millions of years of its history has this secretive old universe displayed such riches, so many generous opportunities, as now.

The only man who can't better himself in such a whirl and swirl of pioneering is the hopeless incompetent, the laggard, the sorehead, the idler or the half-wit.

Courage and effort and imagination and energy never knew such chances since Cheops went pyramid-building.

Wake yourself, shake yourself and DO. North and South and East and West, the call is sounding. For every atrophied acre of farmland in New England, there is a homestead section in a Montana Valley or a Canadian prairie. A thousand cities are about to be born. Help to make them. They will need builders, merchants, lawyers, doctors, manufacturers. Get a map and a time-table.

The most terrific century of all is here. Share it.

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Rehabilitation of Telephone Plants in Ohio Flood District

The Damage Wrought by the Recent Floods in the Ohio Valley—Difficulties Encountered in Placing Telephone Plants in Condition for Operating—"Service First" the Watchword—How the Restoration Work Was Carried on in Columbus

By J. E. Peavey

Through the medium of the press, the public has been kept well informed on the details of the unprecedented and disastrous floods throughout the Ohio Valley in March last. Those interested in telephone work read with great interest of the prominent part taken by the telephone in almost every phase of the great calamity. That they were gratified to see it stand out so prominently and maintain its position as the greatest of utilities under the most unusual and trying circumstances goes without saying.

Preparing to String New Aerial Cable—Making Splice in Air.

While the telephone was keeping the stricken cities in communication with the outside world, it did so in a veritable maelstrom of destruction, and its vitality was sapped to the very core by the relentless flood water. But as soon as the crest of the fury has passed, the indomitable telephone men who had not slept through the seige, followed close in the wake of the receding waters, repairing the damage and restoring the service as rapidly as conditions permitted.

The stocks of line material in all the large cities of the East and Middle West were drawn upon for poles, cross arms and pins, wire of all kinds, both bare and insulated, lead covered cable, and, in fact, all the various accessories which enter into pole line construction work both in the city and country work. When one stops to consider that telephone companies were not the only utility companies calling for construction material, but that power and lighting companies, and electric and steam railways were also demanding immense quantities, it is realized that there was a sudden and quick depletion of available stock, especially as there had been a great demand from Omaha for the same class of material just a few days previous.

Expense was disregarded—"Service First" was the password and material went forward by express or other ways which promised early delivery. The outside plant was not the only part of the exchange equipment to suffer. The water invaded the houses and telephone exchanges. Subscribers' sets were washed away; others were water-soaked and mud-covered so as to be useless for immediate service. The wiring in many cases was entirely beyond service consideration. Private branch exchange switchboards in many business houses were replaced with new ones as the watchword "Service First" would not permit of the time required to thoroughly clean, dry them out and make necessary repairs.

An advertisement of the Home Telephone Co. of Dayton, which appeared in a local paper not long after the water had subsided, indicates the severity of flood conditions in that city.

"Subscribers of the Home Telephone Co. will confer a favor and greatly facilitate the restoration of telephone service by preserving the telephone instruments in residences, stores or offices. Wherever telephones have been wrecked and torn from their positions, we shall greatly appreciate it if you will be good enough to put them aside; our men, with proper credentials, will call for them at the earliest possible moment. Or, if it is convenient

Ready to Run Emergency Cable Across Scioto River—Where Poles Were Broken Off by Floating Buildings.

for our subscribers or other persons to do so, we shall be very grateful if they will bring such instruments to our office."

The exchange switchboards in most buildings were located on the upper floors of the buildings and therefore escaped serious damage. The terminal frames and power

Emergency Cable Covered with 20 ft. Fill.

equipment located on the lower floors were covered by the water and required considerable work before service could be resumed by the exchange.

Among the seriously affected cities was Columbus, Ohio, the capital of the state. Columbus has two telephone companies, the Central Union (Bell) and the Columbus Citizens Telephone Co. The latter company had no exchange in the flooded district but it had many subscribers and an extensive plant there.

The Central Union company had an exchange located in the center of the inundated district that severely felt the destructive efforts of the flood water. Both companies lost heavily but wonderful progress is being made toward restoring the plants to their former condition and telephonically speaking, the great disaster will soon be an incident of the past.

The accompanying illustrations show various operations during the replacement and repairs to the damaged plant. In one, on the preceding page, cablemen are shown preparing to string an emergency cable across the Scioto River at the Broad street bridge, which was carried away by the flood water. The former connections with the flooded district were through cables under the floor of this bridge. The broken end of the old cable can be seen in the lower right-hand corner, hanging from the bridge abutment into the water. The other accompanying scene shows cross arms with parts of poles attached, suspended by wire. The poles were broken off by floating buildings.

Immediately after the water had subsided, construction crews were sent out by both telephone companies. Loads of poles were drawn to various points to be used for rebuilding leads that were carried away by the flood. The view on the left in the illustration at the beginning of this article shows a Central Union crew preparing to string a new aerial cable on West Rich street. The other view in the same illustration depicts a cableman making a splice in a new aerial cable. The cottage on the left stands partly in the street where it was left by the water. Many cottages in the vicinity of which the picture was taken were carried away and completely wrecked.

The damage to telephone, electric light, street railway, and private property is shown in the view in the center of the large group illustration. The cottage in the middle of the picture is being moved back to its former location. This location is in the center of what was the most destructive part of the flood where many homes were completely wrecked and others carried away by the strong current of water. A construction force of the Columbus Citizens Telephone Co. replacing poles which had been carried away is seen in the upper left corner of the same group. Another of the same group shows a cableman of the Central Union company splicing cables in a manhole on West Broad street. Central Union workman rebuilding leads on Rich street are to be seen in the picture to the right at the middle of the group. The two linemen in the middle view at the bottom of the group are traveling on messenger wire between poles, suspended by their safety belts.

The Western Union company laid emergency cable on the ground along the Pennsylvania Railway and this is shown in the lower left corner of the large group illustration. Many cottages were swept away in this vicinity. In the small illustration on this page may be seen the emergency cable covered with a 20-foot fill of the Baltimore & Ohio Railroad. The railways were badly washed out in this district.

The Hill Top office of the Central Union Telephone Co. is shown in the lower right corner of the large group. The water was 15 feet in front of this building but withstood the flood. An A. T. & T. long distance lead is carried on the top arm of the cable pole at the street corner. During the flood, after the water had put the exchange out of service, Mr. Hammel, the wire chief, climbed out of the second story window, made his way on the debris over to this pole and made connection with the city. The bridge from the window to the pole was erected to facilitate repairs after the flood.

In the view on the right at the top of the group is shown the installers recabling and replacing damaged equipment in this exchange. Repairs are nearing completion and much valuable information has been gathered for future use in providing for and handling such emergencies in case they should again arise. Never before in the history of the telephone has there been a parallel in point of taxing the durability and efficiency and resources of telephone systems, unless it was in the tidal wave that wrecked Galveston.

Telephone Investigation Still in Hands of Commission.

In reference to the question of the Bell telephone trust investigation treated in an editorial in TELEPHONY last week, our Washington correspondent informs us under date of April 30 that the matter is still before the Interstate Commerce Commission where it was referred by former Attorney General Wickersham.

Attorney General McReynolds has had some communication with the commission about the matter, but no information is available as to when something will be done. No date for a hearing has been set. The matter of physical connection between Independent and the Bell companies which is before the commission as a result of several applications for such connections and notably by reason of the application of the war department for a connection between the government telephone exchange at Ft. Meyer, Va., and the exchange of the Chesapeake & Potomac Telephone Co., is still under investigation by the commission.

Salesman Outwits Dog by Use of Telephone.

In a recent issue of the Red Wing (Minnesota) Daily Republican, a story is told of two local automobile salesmen who attempted to have a personal talk with a prospective customer living in the country, but were prevented by a faithful shepherd dog who refused to permit them to cross his master's property after dark. After coaxing and trying to pet him without success, they were compelled to drive off in their machine. From the next farm house they tried the telephone and the result was that a deal for a car was closed.

SCENES IN OHIO FLOOD DISTRICT, SHOWING CONSTRUCTION WORK INSIDE AND OUTSIDE THE EXCHANGE.

1. Replacing Poles That Were Carried Away—2. Recabling and Replacing Equipment in Hill Top Exchange—3. Splicing Cable in a Manhole—4. Moving a Cottage Back to Its Former Location—5. Rebuilding Leads—6. Emergency Cable Laid on Ground by Western Union—7. Traveling Along Messenger Wire, Suspended by Safety Belts—8. Hill Top Exchange Where Water Was 15 Feet Deep.

Riding on the Erie

Public Opinion—Tariff—Telephones

By J. C. Kelsey

Popular opinion is a queer institution. It is as fickle and unreliable as it is queer. The Easterner thinks that the Independent telephone industry has been wiped out of existence. The Westerner hardly knows there is a Bell system, unless he happens to have a very long distance call.

The public votes for one telephone system where two exist, and votes for two systems where only one exists.

They have queer ideas of public service corporations. For years the public generally has believed in protecting American industry, but they have not extended this kindness to operating utilities.

Many queer impressions exist about railroads. I have heard men say they would rather walk than ride on the Baltimore & Ohio. Yet this railway is just as complete, efficient and comprehensive as the so-called big roads in Pennsylvania and New York.

You also have heard fun poked at the Erie. As I write, I am on the west-bound Erie, No. 3, curving gently along the shore line of the Delaware river, a beautiful stream.

For scenery, no roadway can excel it. For history, it is a big volume unto itself. And it could run trains between New York and Chicago as quickly and comfortably as any other.

Riding on a train is a monotonous occupation. I never enjoyed it until I got into the habit of writing weekly stories, essays, diatribes, or whatever you may please to call them.

It is said that leading playwrights write their plays while riding on the 18-hour trains between Chicago and New York. Some deaf people can only hear when riding on trains. On the same principle, some people's thought waves may be more responsive when accompanied by the noise of rapid transit.

My first thought was that we are fearfully young in the telephone business. We are, to all intents and purposes, industrial upstarts.

Long before the bloody Civil War, the Erie railroad was born—even before the Mexican war, which Mexican histories are pleased to call "the great North American invasion."

I don't know whether you like history or not, or if you care to associate the heroes of our early national life with events, localities or utilities. As I have always taken great liberties with you, and usually without protest, I feel as if I can go ahead with my thoughts for the day.

The whole path of the Erie railway abounds in historic localities. Alexander Hamilton, the J. P. Morgan of our early history—and possibly his superior in intellect and power—founded the town of Patterson. Aaron Burr, who killed Hamilton in a duel, won his military reputation not far away. His daring exploits around Suffern will never be forgotten. On the hills of Suffern, the French army camped, on its way to Yorktown. Stop a moment and think what might have happened if that French army had not helped us.

During the Revolutionary War, Suffern was the Shibboleth of the country. No one could pass or repass between the North and South without passing through Suffern.

You remember how Jeptha stationed men along the Jordan, and made every one say "Shibboleth." He was watching for the Ephriamites. Likewise did Aaron Burr. All who passed had to qualify themselves forcefully. George Washington, even, drank of the waters of Cambridge Springs back in 1753.

To electrical men, telephone men particularly, the Erie railway has a peculiar significance. The first telegraph train dispatch was sent from the station at Harriman.

Prior to 1851, trains ran on what was called a "time interval system." If a train was very late, the flagman went ahead and carefully signaled his train to follow. No telegraph or telephone. They merely waited with patience for headlight or smoke. How would you like to start for Chicago under such conditions?

Do you realize that most of the useful things in this world have first been done by angry men?

Charles Minot, general superintendent of the Erie, was west-bound and in no mood to be delayed. His train arrived at Harriman on time, and he waited—and the longer he waited, the more indignant he became.

Ezra Cornell owned a telegraph line which paralleled the Erie in places, doing a commercial business only. Finally it occurred to Minot to telegraph to the agent at Goshen and find out if the train had arrived or passed. He was told that the train had not arrived at Goshen.

He then angrily wrote the first train order—"Hold train until I arrive." And he gave an order to the conductor—"Run to Goshen in spite of opposing trains." But the engineer refused to take such an awful chance. He was sent to the back seat on the train, and the official ran the engine himself—safely, of course.

Today Cornell University exists because an angry Erie official used Ezra Cornell's rusty old grounded line and made the Western Union Telegraph grow into a concern which at one time earned 800 per cent. per year upon its actual investment.

I heard that Ezra Cornell realized $1,500 for every real dollar he had in.

I wonder, when you read your morning paper with all its startling news from New York and Europe, if you know which way the news comes.

The printing telegraph gets its impulses between Chicago and New York over the Erie right-of-way. The trunk lines to the Pacific Coast and to Asia accompany this rail line. What a world of stories could be told by this great group of Erie wires!

Today 5,500 miles of metallic copper wire are used by this railway for dispatching trains and attending to the business of the road. Really, you could not successfully operate a railway without the wires. What a wonderful arm to civilization has been the ease of wire communication! It is the free use of wires which really has changed our economic situation.

I don't know whether railways fascinate you as they do me. My first ambition was to fire a diminutive and leaky Missouri-Pacific engine between Hiawatha, Kansas, and Omaha. No, that was my second ambition—my first was to drive the Atchison bus, which followed four dandy white horses.

So you can see that I was always leaning toward transportation. I look upon the telephone today as a transportation medium. We speak of it as a "common carrier." It does transport thoughts, desires, hopes, fears and disappointments.

What is there about wires that makes people fight? The Pennsylvania railway got mad at the Western Union and one fine day simply chopped the poles down. Inside of an hour, the rottenest lead of Western Union poles lay over on the ground.

It really was a foolish thing to do, and it was regretted, too, but it shows that tempers exist even among the big ones. The queer thing about it was that the Western Union was ready, and lost but 22 minutes. Then another line was in operation.

There is another institution which only exists on railroads. That is smoking room discussions.

There was the shoeman, the miller and the employe of the packers. Another sold imported millinery and another dry goods. There was a steel representative, too.

Every man worked under the beneficent and protecting wing of a high tariff!

When you were a boy and were chased every day of your life, pinched and pounded by a big bully, and some one came along and gave the bully the whipping of his life, did it make you sad? Hardly.

That is the way I feel toward the over-protected industries. They have abused their privileges, and have imposed upon us until the worm has turned.

O, I never heard such sad tales!

Do you know that you should pity Gloversville, N. Y., because the duty on gloves has been reduced from $4 per dozen to $2? There is anxiety there. There is weeping and wailing and gnashing of teeth, and children moan in restless sleep!

I pity Gloversville because its glove business seems to run on the skin-of-a-tooth basis. When I contemplate the desolation of Gloversville, I feel that the whole world is hoggish, not to be willing to pay one lone village two or three prices for gloves! If the Gloversville plants shut down, you will lose telephone subscribers, and the world will be upside down (?).

And here is where you are affected again. Mirrors are to be reduced from 11 cents per square foot to 7 cents. The glass men are sad, and are thinking of looking for work driving street cars, etc.! Cut glass will be cut from 60 per cent. to 45 per cent. This will be awful hard on cut glass manufacturers. What an awful tale we will hear about the "downtrodden laborer!

I sat there thinking about the Erie railroad with several hundred million dollars invested, with no protection, and with the public refusing to allow higher rates, and insisting upon two cents a mile. Storms, floods, etc., and further, that twenty billions' worth of railways are taxed for rails, glass and every item, just to keep alive a bunch of manufacturers who have not had even a billion real dollars invested.

Why is it that Americans make a fetich or household god of a dirty, smoky, filthy shop?

Just look closer to home. Independent telephony has invested at least $200,000,000. Independent manufacturers have under ten million.

Would you think it fair if the government protected the manufacturer and fattened him up, while they took the opposite course with you and ground you down to a bare living income?

Fortunately, tariff affairs have no bearing upon telephone apparatus and parts.

Among this group in the smoking compartment, the shoeman seemed to be the most hopeful one, but he also had a stalking fear.

Do you know that if the Chinese begin to wear shoes that you won't be able to buy any at any price? There does not seem to be enough leather to go around! The automobile has changed the leather map.

Say, just a word! The only way out to stop the murder of calves is a decree that no cow or steer should be killed under five years of age.

Your milkman is the worst offender.

I can't get through my head the exact reason that we are factory-mad. Every little town sighs for them—once! And almost every town has two or three of them. But you will notice that the roof has caved in. The boys have broken the windows, and the stockholders have broken hearts!

That is the reason today that you come to Chicago or go to New York to try to finance your property. Your local people, the thrifty ones, were totally skinned by investment in a local factory enterprise. They were deceived by the optimism and enthusiasm of your commercial club.

Today, your honest operating property cannot coax investors in your town, because they were once factory-mad in your town, and went the way of all flesh!

Yet the products contemplated by your local factories were protected clear to the muzzle. The industry was a privileged one. It got encouragement that you never get nor can get. And it got substantial aid from a people bound to cheat themselves to help their beloved industries out. Yet the factory failed.

I certainly believe in the survival of the fit. I have a farm which specializes in sugar beets. Just the minute it will not pay, I will change to wheat or alfalfa. I can't cry, and weep and moan because I can't play with that particular doll named "sugar beets!"

It is utterly unAmerican, anyway, for a group of people to expect greater favors than others get.

The railways, the farms, the telephone companies and other institutions stand on their own bottoms. They have grown out of the high chair unassisted. Why not kick the protected industries out of the high chair? They are big enough to give up their milk diet, and hustle for solid food.

It is not the grocerman's barrel that seats the wise man, who whittles and solves the people's problems. It is the man who travels on the Pullman cars, and sits all day in the smoker part.

He is the boy who settles all problems, a non-producer at that, and nine times out of ten, a beneficiary of a privileged industry.

I hope this is the last train story I will have for some time; yet I do confess that I like to write when riding.

When left to my own thoughts, I get to looking for a reason for the good dining car service (which really does not pay) and the good track and fast trains. You know what it was. It was competition—that poor, abused old institution, which serves the public with so few thanks.

After all is said and done, competition is what the public wants, and it is the only way they get the best of it. Regulation will not give them half of the blessings of competition, and the public really knows it down in their own hearts. No group of human beings can be trusted to administer a property without reserving certain privileges to themselves which they would accord the public when in competition.

I don't believe in price-cutting and such silly practice. No one thanks you for giving your service away. But legitimate competition will live always. I don't believe it will ever die!

Competition gives us train service, at least it taught the public what it could expect even under regulation.

It gave us telephone service, too. It has given our country ten million telephones. Had it been otherwise I don't believe there would be 2,000,000 today.

Our problems are not of the tariff, nor of income tax and currency matters. It merely gets down to the fact that if we do not look out for our business, no one else will.

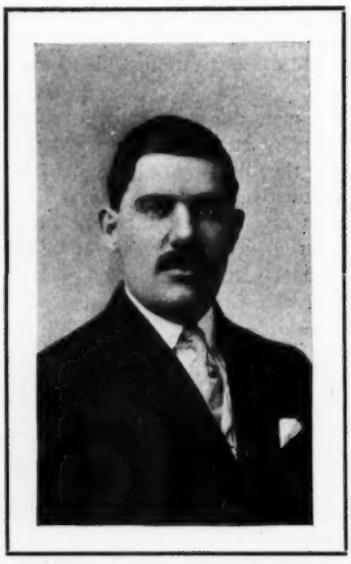
The government should not be expected to do it for a chosen few!

MORAL: We should be content to be architects of our own fortunes.

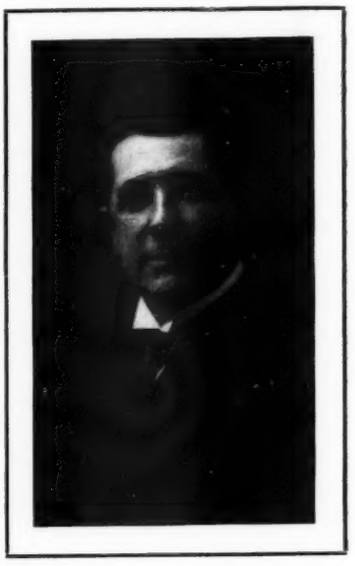
A Quartet of Men Prominent in the Telephone Field

ERNEST L. CLARK, president of the Valentine-Clark Co., with general offices in the Security Bank Building, Minneapolis, Minn., was born at Chicago, Ill., June 4, 1868. He attended the Chicago Public Schools, graduating from the Evanston High School. He entered the cedar business in 1888 in association with E. H. Valentine, now retired, forming the Valentine-Clark Co. The offices of the company were in Chicago for many years, but were removed to Minneapolis to be near the base of the firm's operations. Mr. Clark is the oldest cedar man in the business. He sold the first poles ever used for electric trolley railway work in 1888, to the Thomas Houston Electric Co., for service in Ottawa, Ill. He has been prominent in cedar industry for many years, taking an active part in the work of the Northwestern Cedarmen's Association, of which he was president in 1909. While living in Minneapolis and being a member of the Minneapolis club, and various other clubs of that city, he still retains his membership in the Union League club of Chicago.

SHERBURNE DAVIS LEVINGS, who has recently been made head of the heating division, detail and supply sales department of the Westinghouse Electric & Manufacturing Co., with headquarters in Pittsburgh, was born at Chicago on July 30, 1880. He was educated in the Chicago schools and took a special course in electrical engineering in the Armour Institute of Technology at Chicago. In 1904 he was connected with the Chicago Telephone Co., in the later becoming assistant engineering department, construction engineer for this company. He resigned this position to take charge of the Southwestern office of McMeen & Miller, electrical engineers, his headquarters being in Houston, Tex. He later became associated with Paul Latzke in the conduct of Telephone Weekly, a telephone publication. For two years previously he served as engineer of tests for the Western Electric Co., resigning this position to become electrical engineer for the Edwards Railroad Electric Light Co. He left this position to engage with the Chicago Telephone Co.



CHARLES D. KNOEFEL, director of the Louisville Home Telephone Co., was born at New Albany, Ind., Dec. 20, 1858. He was educated in the New Albany schools and is a graduate of the Louisville College of Pharmacy. He started in the drug business with his father when 15 years old and at the age of 23 engaged in the drug business for himself, both wholesale and retail. He retired from this business in 1912, selling it to one of his clerks, who had been with him for 24 years. In 1896 he organized the New Albany Home Telephone Co., was president of this company for six years, until the merger with the Louisville Home Telephone Co. Has been a director of the Louisville company since the merger. He is a past president of the Southern Indiana Independent Telephone Association, member of the state association, president Southern Indiana Electric Co., director in the Second National Bank of New Albany and the New Albany Trust Co. He is a 32nd degree Mason, Knight Templar, Shriner and Past Exalted Ruler of the Elks.



HIRAM D. CURRIER, in charge of the laboratory and engineering inspection department of the Kellogg Switchboard & Supply Co., Chicago, was born at Cedar Rapids, Iowa, April 15, 1880. He attended the public school at Culver, Indiana, and the Englewood (Chicago) high school. He entered the employ of the Chicago Telephone Co. in 1897, remaining with this company until 1901, when he went with the Maryland Telephone & Telegraph Co., Baltimore, Md. He was with the Century Telephone Construction Co. in 1902, when the company was located in Cleveland, Ohio. Western Electric Company, Chicago and New York from 1903 to 1908, in charge of the circuit laboratory. Engineer for the Duplex Metals Co., New York and Chicago, during 1908 and 1910. Was in the sales department of the Western Electric Co., in 1911 and 1912, leaving this position in September of 1912 to enter the employ of the Kellogg Switchboard & Supply Co., in charge of laboratory and engineering inspection department. He is a Royal Arch Mason and lives at 7339 Harvard Ave., Chicago.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Receiver Asked for Central Union Telephone Co.

Stockholders owning 3 per cent. of the stock of the Central Union Telephone Co., a subsidiary of the American Telephone & Telegraph Co., and operating in Ohio, Indiana and Illinois, have petitioned Judge Dever of the superior court at Chicago for the appointment of a receiver for the company. The complainants are William Read, Charles J. Spencer and Charles G. Foster who on March 4 secured an injunction restraining the sale of the Central Union property to the Chicago Telephone Co. and other subsidiaries of the American corporation.

Stephen A. Foster, of the counsel for the complainants, charges that the directors of the Central Union Company are mere dummies, being elected and controlled through illegal ownership of stock by the American company, and personally are liable under the laws of Illinois to the creditors for many millions of dollars' indebtedness in excess of outstanding stock; that the directors have permitted the indebtedness of $32,700,000 to accumulate, and the interest has eaten up all the net income and prevented dividends since 1896; that there was a conversion of $6,000,000 in bonds into demand notes bearing a higher rate of interest at a cash expense of $300,000 to the company, besides a loss of $200,000 in interest; that the American company owns more than 95 per cent. of the Central Union Stock in direct violation of the public policy and laws of Illinois and in open defiance of the courts; that the Central Union directors planned to sell the assets to the Chicago and other subsidiaries of the American company at a price grossly inadequate, which would just about pay the indebtedness due the American company and leave nothing whatever for the stockholders; and that contracts are in force whereby the Central Union company pays the American Bell company annual rental of between 40 and 50 per cent. of the value of the article rented, the rental being more than $300,000 for telephones valued at about $771,000, In denying the allegations of the Central Union company's solvency, Mr. Foster asserted it was "once a prosperous concern," but "has now been reduced to financial straits bordering on insolvency," though occupying "the best telephone territory in the United States."

"The American Company," said Attorney Foster, "compelled the subsidiary company to purchase all materials from it. In 1911 the Central Union Telephone Co. had to pay $1,400,000 more than the materials were worth. In 1912 the excess charge was $1,500,000. The American company also exacted 4½ per cent. of the receipts of the Central Union company in addition to the exorbitant rental on instruments.

"Less than one-half of the enormous debt of $32,000,000 owed by the Central Union company was authorized by the board of directors and the executive committee. Of this debt only $1,000,000 was authorized by the shareholders. The plaintiffs own about 3 per cent. of the stock. The rest is owned by the American Telephone & Telegraph Co. My clients bought the stock without knowing that the majority was held by the American company. They did not know of the conditions charged in the bill until recently."

It was declared that the Chicago Telephone Co. is allowed by the A. T. & T. Co. 10 cents per call on outgoing long distance calls and nothing on incoming calls. The Chicago Telephone Co. pays the city of Chicago 3 per cent. of its total revenues or 3 mills per outgoing call, whereas the American company does a total business in incoming and outgoing calls amounting to $2,000,000 annually without a franchise from the city. In the brief presented by complainants they asked that the present officers be continued in power and that a hearing by witnesses be held.

Robert N. Holt, of counsel for the defense, began his presentation at the conclusion of Mr. Foster's opening statement. A general denial of allegations of fraud and extravagance was entered. "Here the only charge of monopoly rests on the common ownership of stock," said Mr. Holt. "A decision of the Illinois Supreme Court handed down last Wednesday declares the common ownership of stock in cases of this nature legal. There has never been competition between the American Telephone & Telegraph Co. and the Central Union company, and we cannot therefore be restraining trade."

Legislative Bills in Wisconsin.

Both the senate and assembly have indefinitely postponed bills providing that telephone companies shall not charge a toll where it never has done so in the past. The Kneen bill, fixing January 1 of each year as the date when all balance sheets of public utilities must be filed with the state railroad commission, has passed both houses and will be signed by the governor.

The legislation of largest interest to telephone men which the present legislature has before it is a proposal to extend the principle of the physical connection law to town telephone companies. In the physical connection law passed two years ago, the farmers' mutual companies were exempted from the order to furnish toll line connections with what might be deemed rival concerns. The new bill will be so drafted by the time it reaches the floor that upon order of the railroad commission practically every extension of toll line service can be directed, if necessary, to place every telephone in the state upon a universal toll system.

Indications are that there will be no change in the form of telephone taxation at this session.

Denies Constitutionality of Wisconsin Law.

That the Wisconsin Telephone Co. regards as unconstitutional the 1911 Wisconsin law requiring physical connection by two telephone companies when a patron demands a connection with another line, is the stand taken by the Wisconsin company in its answer to a complaint filed with the state railroad commission by E. D. McGowan of Janesville. McGowan petitioned the commission for an order directing that physical connection be made between the Rock County Telephone Co. and the Wisconsin Telephone Co. The commission will hear the arguments sometime in June.

In protesting against the investigation demanded in McGowan's petition, counsel for the Wisconsin Telephone Co. contends that McGowan has no authority to present such a petition and that the physical connection law conflicts with both the state and federal constitutions in that the order asked for would deny it equal protection of the laws and the right of trial by jury, and would deprive it of property without due process of law and without just

compensation. The answer sets forth that the Wisconsin Telephone Co.'s lines are operated in conjunction with the American Telephone and Telegraph Co., engaged in interstate commerce, and that an order requiring physical connection with the Rock county lines will interfere with and disturb interstate commerce. The answer also denies that the state railroad commission has jurisdiction.

The company denies that the petitioner McGowan is unable readily and conveniently to use the toll lines of the Bell company at Janesville because of the lack of physical connection between the two telephone systems. The company admits that it has refused to grant demands for such connections and that it has not made any arrangements therefor. It says that public convenience and necessity do not require it, that the connection cannot be readily made and would result, if made, in irreparable injury to the owners and users, and in "substantial detriment to the service furnished by both companies." Such connection, it adds, would not greatly extend the use of the telephone systems or be of great advantage either to the community or subscribers, but it would result in great advantage to the Rock River Telephone Co. at serious cost and detriment to the Wisconsin Telephone Co.

Bell Buys New York State Companies.

The New York Public Service Commission has received notice from the New York Telephone Co. that it has acquired the physical property and business of the Commercial Union Telephone Co., at Saratoga Springs, and Mechanicville.

Metropolitan Company May Use Its Name.

The Metropolitan Telephone & Telegraph Co., of New York City, may continue to sell its bonds, under a ruling made recently by the supreme court. The court denied an injunction to the New York Telephone Co. restraining the promoters from using the new name on the ground that it was the name of the original telephone company of New York, which was succeeded by the New York Telephone Co., and which still has over a million dollars in bonds outstanding.

Jurisdiction Over New York Telephone Lines Unchanged.

By a vote of 24 to 22, the senate of the state of New York defeated the bill of Senator Fitzgerald to transfer the supervision of telephone and telegraph lines in New York City from the jurisdiction of the Public Service Commission, Second District, to that of the Public Service Commission, First District, which now has charge of transportation problems in New York City. It was believed that the change would demoralize the work of both commissions.

Larrimer Bill Passes New York Senate.

The New York senate recently passed the Larrimer bill, which fixes a rate of 5 cents for a telephone conversation between any two points in greater New York. This rate is for 5 minutes' conversation instead of for 3 minutes, as at present, and provision is made for a refund of all overcharges. The bill was opposed by the Republican members, who declared that the matter was one which should be left to the Public Service Commission. In speaking of the action of the senate, F. H. Bethell, vice-president of the New York Telephone Co., said:

"We regret the passage of the Larrimer bill. It seems to us that such action is contrary to the established policy of the state. Heretofore such matters have been considered and disposed of by the Public Service Commission. We never have questioned the jurisdiction of the commission, and from time to time have accepted its verdicts as final in all such vital matters.

"Furthermore, we are sorry to learn that the state legislature deemed it proper to take up this subject, when at this very time there are a number of cases bearing on the same matter now in the hands of the Public Service Commission. We are of the opinion that all concerned in the matter, both the telephone company and the members of the commission, should have been permitted to settle the question.

"It is too early to predict what will be the results if the bill becomes a law. In the present state the bill is somewhat ambiguous."

Telephone Service in Detroit.

A resolution offered by Alderman Barnett in the Detroit city council asking for an investigation of telephone conditions in Detroit has been referred to the public utilities committee. General Manager Arthur Von Schlegell of the Michigan State Telephone Co., is of the opinion that metered telephone service is the only solution for the crowded condition of the telephone lines and that until the service is put on that basis and unnecessary calls eliminated an investigation of the company by the common council is not likely to arrive at any practical result. The company has found, according to Mr. Von Schlegell, that the business to Windsor over the river cables has decreased materially since the plan of charging for every call was put into effect.

Legislative Results in Michigan.

For some months, or ever since the Michigan legislature convened, there has been agitation from all over the state for new laws regulating telephone systems. On eve of adjournment two of a half dozen or more measures introduced became laws. Chief of these is the bill introduced by Representative Bayliss designating telephone companies as common carriers, placing the systems under the supervision and jurisdiction of the Michigan state railroad commission and vesting that body with power to declare unlawful all rates and charges which shall be determined unjust, and also with power to make, alter, abolish or amend such rates, and regulate by rules and orders any service or facility.

The commission shall, under the act, likewise prescribe the standard of construction and equipment to be maintained. The act prohibits discrimination in rates of service where conditions are similar. It also gives the commission authority to compel physical connections with other systems where the convenience of the public makes such connections advantageous and desirable, and to prescribe switching facilities without favor or discrimination. In case any company desires to sell to another company, the buying company shall join with the selling company in an application to the commission, setting forth the conditions and price proposed. If the commission is satisfied that such sale or merger is not in conflict with the public interests permission may be given, the properties to remain under control of the commission. The same conditions apply to propositions for leasing properties.

Another bill passed the last day of the session was one introduced by Senator Wood requiring telephone companies to place telephones in railway stations or other transportation places used by the public. An effort was made to get through a law making it unlawful for telephone companies to collect rentals in advance, but this provision failed to materialize.

Proposed Consolidation at Zanesville, Ohio.

The Merchants' board of the chamber of commerce recently adopted resolutions favoring the proposed merger of the Bell and the Independent telephone companies in Muskingum county.

Ohio Companies May Discontinue Service Wrongly Used.

The Ohio commission has ruled, in the cases of Harry Aiken and Thomas and James Flannery against the Cincinnati & Suburban Bell Telephone Co., that any telephone company may remove a telephone when it has reasonable grounds for sus-

picion that the customer is using the service for illegal purposes. The company had removed the telephones used by these men after complaint had been made by the chief of police of Cincinnati that they were suspected of getting patronage for hand books over telephone wires. The complainants asked the commission to compel the company to restore service after it had been refused unless they agreed to sign a pledge not to use a telephone for the furtherance of alleged schemes.

May Form a Co-Operative Company at Anderson, Ind.

A citizens telephone committee which has been working for several months at Anderson, Ind., to secure a reduction in telephone rates is proposing to organize a citizen's co-operative telephone company. It is said that this plan will be followed unless the city council takes steps to establish a municipal system.

Extension Rates Reduced by Cheaspeake Company.

The Chesapeake & Potomac Telephone Co. has made a reduction in its extension telephone service in Norfolk, Va. Hitherto, the rate for an extension telephone has been $18 per annum. The new rate schedule, which has already gone into effect, is as follows: extension stations on unlimited business telephones, $12; on message rate service business telephones, $6 and on unlimited residence telephones, $6.

A Competitive Situation in Oregon.

Two members of the railroad commission of Oregon recently heard arguments in a telephone hearing at La Grande, Ore., in which the local telephone company in that city endeavored to compel a farmer's line doing business in the county, to raise its rates. The plaintiffs showed by evidence that rates charged brought the farmers' line $264 a month gross receipts against $19,000 debt and a total plant cost of $30,000. This, it was claimed, made unjust competition. The defense admitted that the revenues did not meet expenses but attributed this to the newness of the system.

Rate Applications in Oregon.

Numerous applications are being received by the Railroad Commission of Oregon from telephone companies all over Oregon for authority to keep present rates in force or to make readjustments of rates. Many of these are due to a provision in the public utility act providing that rates should not be increased above those in existence on January 1, 1911, without the consent of the commission. As the act was held up for nearly two years by referendum, a large number of rates were increased in the interim, and authority must now be secured, after hearing, to continue these rates in effect.

Louisville Case to Supreme Court.

Counsel for A. H. Englehard and other subscribers of the Cumberland Telephone & Telegraph Co., of Louisville, Ky., have filed formal notice of appeal to the United States Supreme Court from a recent decision of Judge Evans of the federal court at Louisville, Ky., respecting the rates of the Cumberland company. This appeal is supplementary to an appeal taken several days previously by City Attorney Beckley for the city and raises the same points. Instead of ordering the Cumberland Telephone & Telegraph Co. to distribute among subscribers the money collected by the company between 1909 and 1912 in excess of the ordinance rate of $66, Judge Evans ruled that the company had before him a suit to enjoin the city from enforcing the $66 rate, and he thereupon appointed the clerk of his court, A. G. Ronald, as special master to take proof. One of the points to be made in the appeals will be that this appointment is prohibited by statute and that all parties to the litigation except the Cumberland company object to Mr. Ronald serving in the case.

Will Discuss Readjustment of Rates.

At the annual meeting of the New Bedford Telephone Co., of New Bedford, Pa., to be held in May, the subject of a readjustment of rates will be brought up.

Tennessee Companies Filing Tariff Rates.

In accord with a recent ruling of the Tennessee Railroad Commission the telephone companies of that state, as well as the express and telegraph companies, are filing their rate schedules with the commission.

May Order Wires Placed Underground.

A revised ordinance was recently presented to the city council of Macon, Ga., relative to the placing of all wires of telephone, telegraph and light companies under ground. It was referred to the committee on ordinances and resolutions.

Telephone Ordinance in Sacramento, Cal.

E. M. Wilder, commissioner of public works of Sacramento, Cal., is preparing an ordinance fixing the rates to be charged by the Pacific Telephone & Telegraph Co. As a result of the public hearings and several conferences with the state railroad commission, the proposed ordinance will prohibit the requiring of a deposit of $5 when telephones are installed, and the penalty of 25 cents charged when a bill is not paid before the tenth day of each month.

Hearing Before Washington Commission.

The public service commission of Washington will take testimony on May 6 and 7 at Seattle, Wash., in connection with the complaint of the Northwestern Long Distance Telephone Co., against the Pacific Telephone & Telegraph Co., or the Bell system, alleging that its long distance calls are being diverted over the Bell wires since the consolidation of the two systems in Seattle. The Northwestern company alleges the loss of about $2,000 a month in tolls and asks an investigation by the commission. Already the matter is pending before the federal authorities, who are interested in the alleged merger of the two systems, which it is claimed is contrary to the federal statutes.

Louisiana Commission Permits Consolidation of Offices.

The Louisiana Railroad Commission has granted permission to the Western Union Telegraph Co. and the Cumberland Telephone & Telegraph Co. to consolidate their offices at Jeanerette, La. This was a test case and the decision was followed by the announcemnt that the offices of the two companies will be consolidated at other points in the state. Complainants argued before the commission that the proposed consolidation was part of a scheme to eliminate competition and increase telegraph rates. The commission said it did not anticipate that such a proposition would result in stifling competition and added that an increase in telegraph rates would not be authorized.

Veto for Regulation Bill in Minnesota.

Governor Eberhart, of Minnesota, recently vetoed the Minnette bill designed to place the regulation of telephone companies in the hands of the state railroad and warehouse commission. The reasons given by Governor Eberhart for his action are as follows:

"The bill contains no provision for the control of stock and bond issues. While the principle of state control is right, there is no valid reason why a separate law should be enacted for each utility. The railroad and warehouse commission already has enough work to do. All recognized authorities on public utility control recognize the fact that regulation should be by an appointive, and not an elective, state board, nonpartisan in character." The governor reiterated his former declaration that he would call an extra session to secure the enactment of a satisfactory public utilities bill.

Practical Subjects—Letters and Discussions

Automobile Kept Exchange in Service.

During the recent Ohio River floods, the plants of the Paducah Light & Power Co. and Paducah Traction Co., Paducah, Ky., shut down. The Paducah Home Telephone & Telegraph Co. was dependent upon both of these concerns for power to operate either the mercury arc rectifier or the 500-volt motor-generator. When both of these agencies failed, we were required to skirmish, and make quick arrangements for power to charge our storage batteries.

We have a Model T Ford runabout, which we jacked up in the rear of our building. We took off the rear axle and differential; placed the shaft of the automobile in 1-inch boxing; placed a 10-inch pulley on the shaft and a 6-inch pulley on the shaft of the generator; and very successfully charged our batteries with this arrangement.

We were deprived from the use of regular power for a period covering ten days. The Ford engine was running at an average of 40 miles an hour for the ten days and if it had been on wheels, would have covered 4,800 miles. The engine was run about 12 hours each day, and, owing

The Automobile Used as an Emergency Power Plant.

to the fact that many of the subscribers were marooned, the telephone was the only means of communication. We gave uninterrupted service and for a week slept and fed all our operators in the telephone building.

The Ford behaved in an extremely satisfactory manner. We never had to stop for any trouble with the engine, or to clean the spark plugs. We had a constant stream of water running through the radiator. Although the exhaust pipe was red hot from the first cylinder to a distance of 12 inches below the last cylinder, yet the engine never overheated. It carried a 70-ampere load without the least difficulty, and could have carried 100 amperes easily. Our load was carried very steadily, and without a three point deflection on the ammeter. The auto had been in service by the telephone company for three years, and has run 55,000 miles. It is still in good shape and running every day.

H. J. Jeffrey, District Manager,
Paducah, Ky. Paducah Home Tel. & Tel. Co.

Exchange Helped Fire Alarm System During Flood.

During the recent flood in Warren, Ohio, the city fire alarm system was crippled owing to the withdrawal of the 500-volt power circuit from which the batteries were charged. The Warren & Niles Telephone Co., under the direction of E. G. Miller, general manager, ran a temporary wire across the street from the telephone exchange batteries which were being charged from a temporary gasoline engine power plant and furnished the fire department with current to keep their batteries charged and in service. This was continued for a week or more.

The telephone service furnished during the flood by the Warren & Niles Telephone Co., which operates an automanual system in Warren, was fully described in TELEPHONY of April 12. A description of the temporary power plant was given but nothing was said of its ability to furnish more than enough current for operating the exchange.

A Cross Between Telephone and High Tension Lines.

Wm. A. Riedel, general foreman of the A. D. T. Co., at Cleveland, Ohio, reports the following experience. During the tornado in March, a Vac-M arrester in the terminal board, in his central office at Cleveland, suddenly commenced glowing very heavily. Knowing that it was caused by a high tension cross, Mr. Riedel promptly, with a stick, disconnected the fuse which had not blown, as the arrester was connected between the fuse and the line.

None of the central office equipment was injured in the least. Removing the fuse, of course, made it impossible for the high tension current to get into the central office equipment. Mr. Riedel then took some men and started to locate the trouble. As the line came no where near any high tension, it was a difficult matter to locate. Knowing the cross was a most dangerous one to handle, Mr. Riedel, in order to protect his men, fastened some heavy insulating wire on the end of a broom handle. He then stuck a file on the end of another broom handle, connecting the other end of the wire to this and with a "Vac-M" arrester on a board.

He directed one man to climb a pole and test for the suspected wire, placing the end of the broom handle wire on each aerial line in succession. Meanwhile the other man remained on the ground. With the broom handle having the file in the end, he scraped the file lightly along on the earth as the man on the pole tested the wires. When the latter got his end of the wire onto the line which was crossed, the "Vac-M" arrester glowed and thus they were able to locate the wire causing the trouble.

It was finally located in a telephone wire which was down on the telegraph line. The men found that the telephone wire was crossed with a 4,600-volt power line about a mile away from where the telephone wire was crossed with the telegraph line. This is a unique and safe method of handling what otherwise would have been a very nasty proposition to locate.

How One Company Is Improving Its Service.

Being one of the charter members of the Telephone Service Association, we have tried to carry out the wishes of this organization as near as possible. All of our operators were required to study the rules given out by this association and 60 days notice was given them that they would be examined in order to find out if they understood their business. This examination was given to 30 of them on April 24. In the smaller offices the examination was oral but in the larger offices it was a written one. I will say that they passed with a high grade considering that some had only been in the service six months, while some had been with us ten years.

The following questions were the ones used. The local operators were examined on the first ten and the long distance operators were required to answer the 20 questions. We credited each local operator ten for each question correctly answered while the long distance operators were credited with five for each correct answer. After the examination was over, the operators were allowed to keep the questions which referred to the sections in the book of rules that they might find out the answers.

The questions which were asked were as follows:

1. What is the law on secrecy of communication by operators? Sec. 86.
2. What can you say about harmony between operators and patrons? Sec. 87.
3. What is the duty of an operator upon receiving a complaint? Sec. 90.
4. Write at least 30 words about a good voice at a switchboard and how it may be obtained. Sec. 91.
5. Name one responsibility of an operator.
6. Write a short essay on "Relief of Operating Employes," or "What should be done before leaving the board?" Sec. 93.
7. What can you say as to how apparatus should be cared for? Secs. 94 and 95.
8. What is the duty of an operator upon finding a line busy, when some one has called for that particular number?
9. How should an operator behave when coming in or going out of a room, and also while on duty?
10. Tell what you think constitutes a good operator.
11. Write out in full the meaning of following code letters: N. D., A. B., O. D. C., G. B. A., L. W., B. N. R., D. S., O. D. T., U. N., U.
12. Fill out tickets as they should go to the book keeper for "Sent," "Received," and "Through."
13. What letters do you use when you have the party? How should you answer when called?
14. Name everything necessary to be done before passing a ticket. Sec. 110.
15. What is the meaning of (a) "sent" ticket; (b) "sent paid"; (c) "sent collect"; (d) "through" ticket. Secs. 100 to 103.
16. Do you leave directions for the operator relieving you? Do you always keep a record of messages whether sent or cancelled? How long must you wait on a line before ringing in, if any one else could use it besides yourself and the station on the other end?
17. What is the duty of an operator who has a three-way jack in her board? Sec. 108.
18. How should a signal be given? What would you say if you call an operator and get the report of N.C.?
19. What do you consider constitutes a good toll operator?
20. How do you handle your overtime charges? What should be done if called party refuses charges? Sec. 136.

Thinking this might help some managers and operators we are sending it to you for your use if you find room for it.

National Telephone & Electric Co.,
Clinton, Ill. B. F. Wasson, president.

Lamp Screw Grounded Circuit on Switchboard Frame.

Recently the fuse on one of our cord circuits would blow at frequent intervals. I understood very readily the reason for this was that the cord got too much ground but just where the ground was, puzzled me for several days. As the ground came only once in a while, it was more difficult to find them if it had been on all the time. If the latter had been the case, it would have been a small matter to have taken a head receiver and tested it out, but I never happened to catch it at the time the ground was there.

One day when I had taken position apart, having the keys out and testing for a ground, I happened to look at the screw which was holding the lamp frame and it occurred to me that possibly the screw went through far enough to come in contact with the switchboard frame which had a ground on it all of the time. Sure enough, the screw went through far enough so that just a little jar of the switchboard or hitting the cap of the lamp associated the cord, would cause it to make contact with the frame. It will be noticed on diagram that, when the cord is in use, the relay is drawn up, feeding 24-volt battery current to one side of the lamp. The current

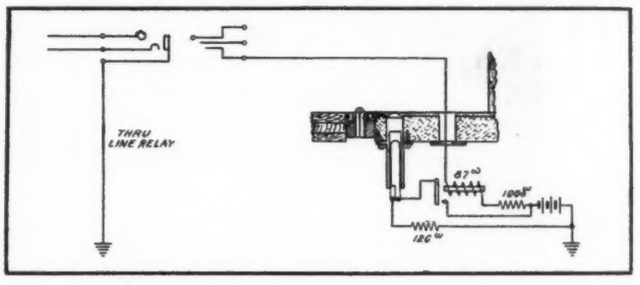


Diagram Showing How Fuse Was Blown.

would then flow to ground by means of the switchboard frame contact at the screw and of course there was nothing to prevent the 1 1-3 ampere battery fuse from blowing.

Salina, Kans. EDW. ANDERSON.

Pays $40 for a Telephone Number.

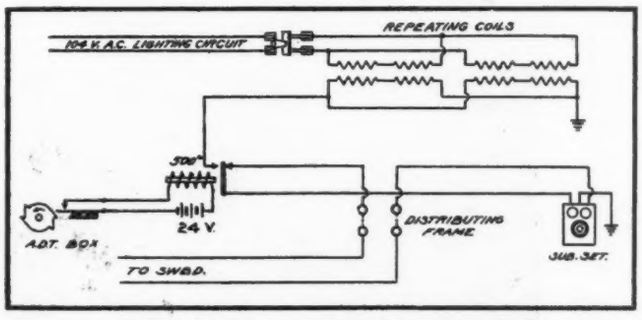
A new firm which started in business in Hutchinson, Kan., recently paid $40 for a certain telephone number. It was No. 1, and belonged for a number of years to G. C. Curtis. The new firm which bought his telephone number advertised that it would pay $25 for a low number and then hunted up the holder of No. 1. Mr. Curtis refused to sell his right to this number for $25, holding out for $50. A compromise was effected and he was paid $40.

The Federal's Courteous Policy.

There is a street car strike on in Buffalo, N. Y., and the press of that city reports that when the telephone operators finished their work at night, the Federal T. & T. Co. sent them home in automobiles. It is considerate treatment like that which inspires loyalty among employes for the company, and increases the efficiency of the force.

Telephone Fire Alarm for Small Towns.

The diagram which accompanied the article on the telephone fire alarm system in the issue of April 12, page 44,



Circuit of Telephone Fire Alarm System.

showed the switchboard in multiple with the subscriber's line. Mr. Nicholas calls attention to the connection in that the switchboard should be in series with the line and thus cut off when the fire alarm is being sent. The correct circuit is shown in the accompanying diagram.

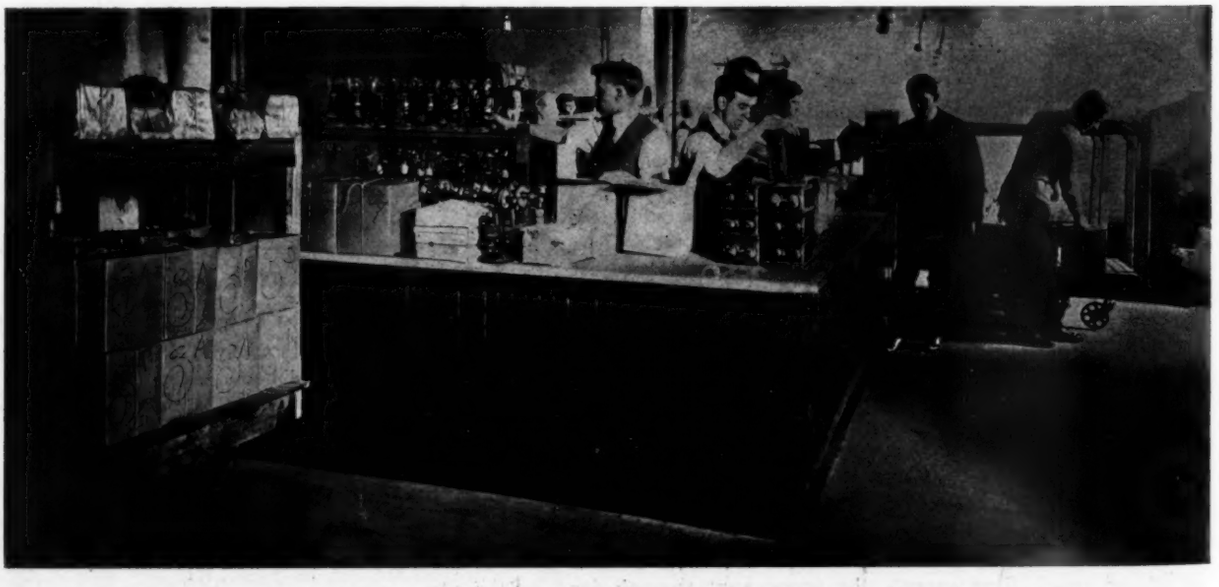
City Ownership at Thief River Falls, Minn.

The citizens of Thief River Falls, Minn., recently voted a bond issue of $35,000 for the purpose of taking over the system of the Tri-State Telephone & Telegraph Co. for operation by the city.

"The Plant Man on the Job"—A Day Spent With the Pl

No. 27. Assigning Call Number and Cable Conductors to a New Subscriber's Line and Writing the Contract Order in Manifold for Use by the Various Departments.

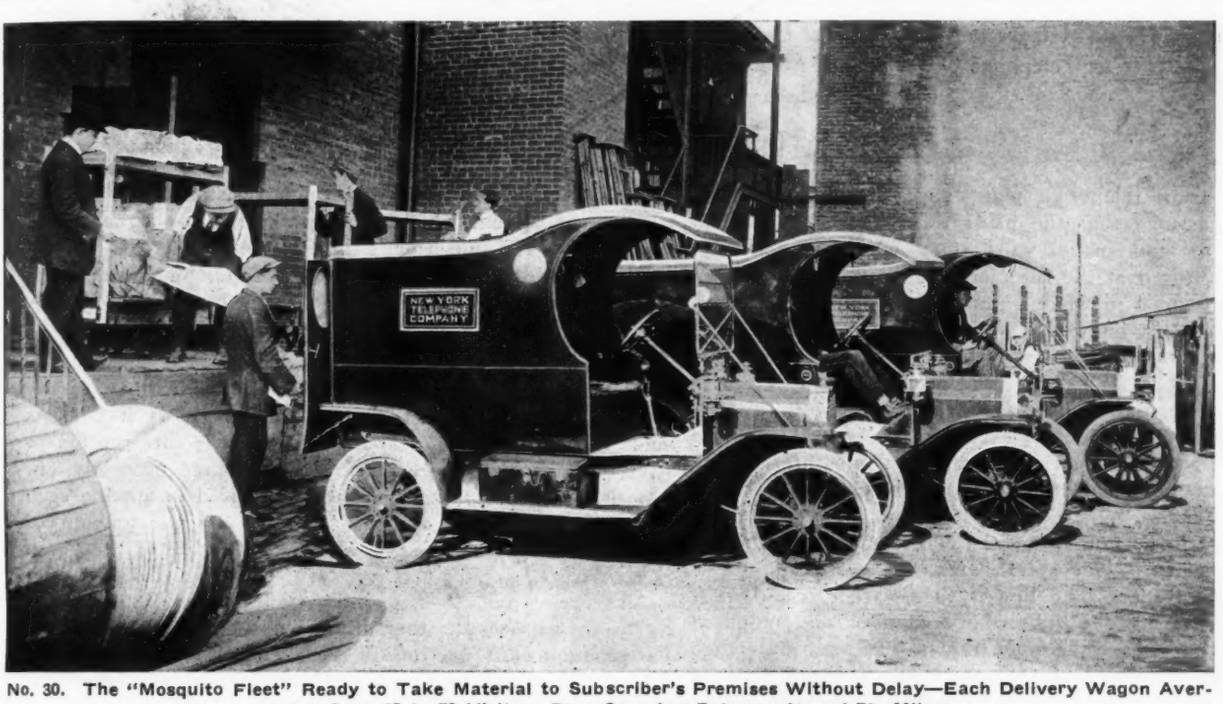
No. 28. The Clerical and Supervising Work of the Instrument Installation Force.



No. 29. Preparing Station Apparatus and Material for Quick Delivery to the Subscriber's Premises.

These Photographs, Which Are Here Shown Through the Courtesy of t

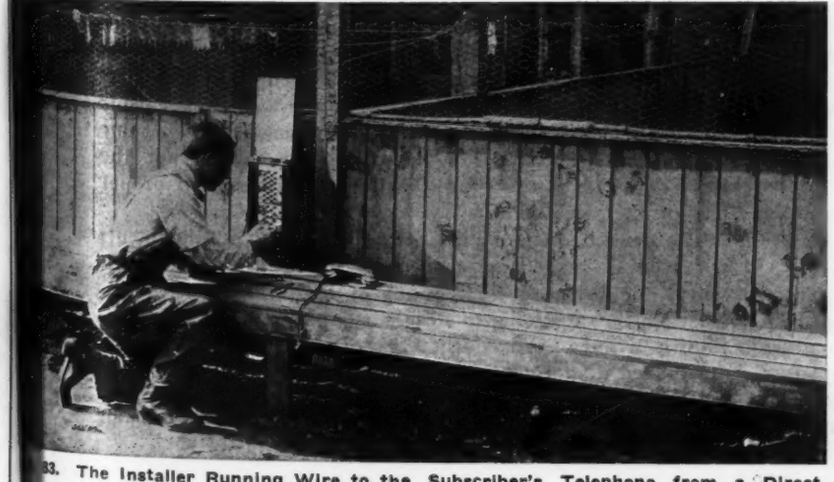
epartment on Long Island, Told in Instalments by the Camera



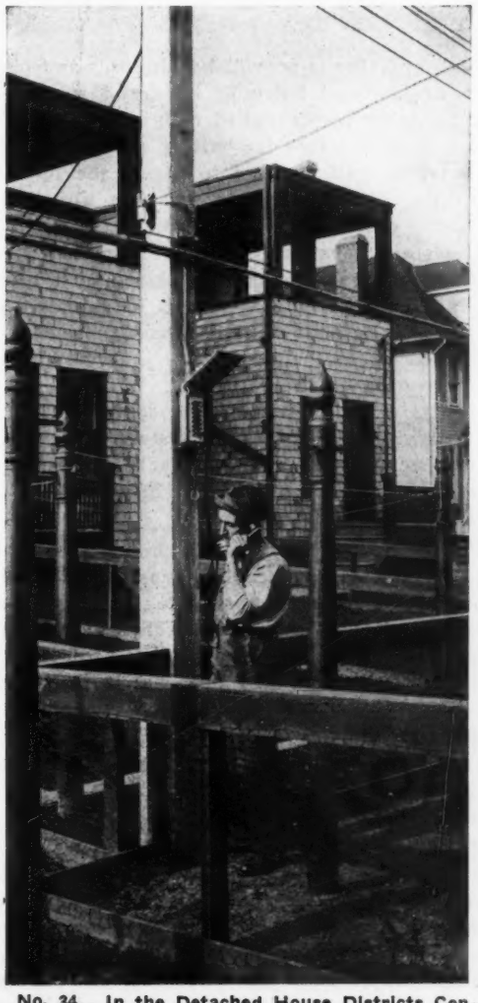
No. 30. The "Mosquito Fleet" Ready to Take Material to Subscriber's Premises Without Delay—Each Delivery Wagon Averages from 65 to 70 Visits a Day, Covering Between 60 and 70 Miles.

31. Delivering Instrument and Installing Material in the Subscriber's House.

No. 32. Installer Arriving on the Job Ready for Work.



33. The Installer Running Wire to the Subscriber's Telephone from a Direct Connected Block Terminal.



No. 34. In the Detached House Districts Connection is Made to Cable Box Placed on Cement Poles, Jointly Used by the Electric Light and the Telephone Companies, on Rear Property Line—Boxes Are Placed Low on Pole, Accessible to Installers and Troublemen, Without Use of Ladders.

e Review, Will be Concluded in the Next Issue of This Paper.

Maintenance of a Common Battery Telephone System

Complete Details Relative to Maintenence of Local Plant and Toll Lines as Given by District Manager of Wisconsin Telephone Co. at Annual Meeting of Wisconsin Telephone Association, Recently Held at Madison—Bell Practice and Specifications

By Franklin J. Mayer

In discussing telephone plant maintenance, we would ordinarily assume that the plant was constructed and in operation, as maintenance work starts when the construction crew turns over the completed job, but, as we are not all equally versed in what a modern telephone plant consists of, it might be well to briefly review what goes to make up a common battery system. I speak of common battery as that is the system used in the majority of cities from 30,000 population upwards.

We will first consider the exchange, or central office, in which are located the switchboard, main and intermediate frames, protectors, batteries, charging machines, and testing apparatus.

The subscriber's line enters the central office through an underground cable which terminates on the horizontal side of the main frame. The line is then wired to a pair of protectors bearing the subscriber's number and mounted on the vertical side of the main frame. The lines are cabled to the horizontal side of the intermediate frame and the multiple jack located in the switchboard. The terminal on the intermediate frame admits of the line being connected to a line relay or some signalling device with battery in series.

Each operator is provided with cords and plugs equipped with ringing and listening keys and supervisory signals. The cords are also supplied with battery through repeating coils. This furnishes the battery supply for the talking circuit, as the battery used to signal the operator is automatically cut off, together with the signalling apparatus, when the operator answers a call.

The storage batteries are of the standard type chloride accumulator, and are usually placed in a room by themselves. The charging system is in duplicate and consists of a motor-driven, direct-connected generator as one set, and a gas engine belted to a generator as another.

The testing apparatus consists of a test table, which in reality is a small switchboard, equipped with meters and other devices necessary for testing and locating trouble. It is also provided with trunks to the main switchboard and main frames which admit of testing any line in the exchange.

The long distance, or toll, circuits are brought in through special underground cables constructed of large gauge copper conductors. Before going to the toll switchboard, they pass through a toll test table which is equipped with testing apparatus, and permits all the toll lines to be tested and to be so re-arranged as to patch the circuits, or make good one circuit out of the good conductors of two defective circuits.

The subscriber's line leaves the central office by means of underground cables. These cables branch out and in turn feed aerial cables which go to form the general distributing scheme of the city.

Aerial cables are used extensively and practically every subscriber can be reached by a twisted pair service drop from the distributing box to the house. The line enters the house and terminates on an arrester; from the opposite side of the arrester the wires are run to the instrument The line is now ready for service and the operator can be signalled by the subscriber removing his receiver from the hook, closing the line through resistance and causing a flow of current which actuates the line, or signal, relay, and causes the subscriber's light to come in.

We now have the plant in operation, trouble occurring daily and a gradual depreciation going on.

Maintenance.

Maintenance can properly be divided into two classes, current repairs and general repairs. The former, in my estimation, is by far the more important, as it consists not only of repairing defects which cause interruption to the subscriber's service and must be cleared promptly, but of thoroughness and promptness exercised in making such repairs which have a direct influence on the amount of general repairs necessary, as also on the life of the plant.

It naturally follows that a plant upon which current repairs are given close attention will develop the highest grade of service, all other things being equal, and will show a pronounced reduction in the general repair estimates. This fact is generally acknowledged by most companies, and the question of current repairs has been given careful study.

The system now followed to a great extent is, I believe, a good one, and not only enables us to keep the equipment in serviceable condition, but tends to conserve the property to its maximum life.

From the consumer's standpoint good maintenance consists of repairing and restoring his service promptly after he has complained of his telephone being out of order. A few years ago this idea was shared by some telephone men, but the modern idea is not only to repair trouble promptly, but to set up a system of testing and records that will enable us to detect and remedy defects before the plant has become damaged to an extent which will cause interruption to the service.

The greatest improvement in maintenance in the last few years is the manner in which actual trouble found is being tabulated. The records so obtained are being studied and used to develop knowledge of the proper method of caring for the equipment, and of the most desirable equipment to use, all of which has a tendency to reduce maintenance costs to a minimum and to improve the efficiency of the service.

The efficiency of a maintenance force is determined not by the trouble cleared, but by the efficiency of the service which it maintains, and the trouble which it prevents. It is needless to say that trouble will occur with the best organization and the best plants. Storms will damage cable and other outside plant. Subscribers' stations will become inoperative by reason of a number of causes, not the least of which is the subscriber himself, through improper use of the equipment.

The central office equipment will get out of adjustment; wires break or become corroded; circuits lose their continuity, due to loose connections or high resistance. Considering the many parts necessary to complete a connection, it will be realized that the opportunities for trouble are indeed numerous.

Routine tests are made by the traffic and plant departments and any bad conditions are promptly reported and repaired.

Insulation tests are made by the traffic department by means of a voltmeter every night in the week except Saturday. A record of the tests is made and reported to the maintenance department and a representative of the wire chief's force makes a voltmeter test of all the lines once a week to determine the accuracy of the tests made by the traffic department. The tests so made are entered on a form specially designed for that purpose, and any condition which denotes trouble or liability for trouble is promptly taken care of. Such cases as show no trouble, but a condition which will develop into trouble, if not cared for, are also reported and corrected. These tests are made at night so that the subscriber will not be interfered with.

The switchboard equipment is tested every night by one of the wire chief's force, and the testing apparatus used operates the equipment in practically the same manner as when in actual service. Any defects developed are repaired before 7 a. m., the following day, so that, when the heavy load comes on the traffic, the switchboard is in as good condition as possible. In addition, the district wire chief, who is, in a way, a general inspector over a number of wire chiefs, makes periodical inspections of the equipment to check up the manner in which the property is being maintained.

Reporting Trouble.

In case of actual trouble not detected in the regular tests, which wholly or partially destroys the subscriber's service, we are frequently aware of the condition before the subscriber detects it, due to the fact that grounds and short circuits cause the subscriber's signal to remain permanently lighted and call the traffic department's attention to the trouble. In such cases, we are often able to clear the trouble before the subscriber has realized that his service has been affected.

The public has been instructed in a number of ways to report all trouble to the chief operator, but, nevertheless, various members of the local force receive complaints, and the instructions are that anyone receiving such a complaint will promptly refer it to the chief operator. Each trouble is given a number; a trouble ticket is made out containing the information which will be necessary for clearing the trouble; the line is tested, and the result of the test shown on the trouble ticket. The ticket is then passed to the wire chief's department which takes charge of the clearing of the trouble.

The wire chief's office is provided with a card record of each subscriber. The information on the ticket received from the traffic department, or from routine tests, is copied on the subscriber's card, and the trouble assigned to a repairman. After the repairs have been made to the satisfaction of the subscriber and the test table man, the trouble found, the time cleared, and the name of the repairman doing the work are recorded on the subscriber's card. A daily report of trouble is made by copying the reports from the subscribers' cards, and the trouble is entered on special forms for that purpose, showing the classification as to the nature of the trouble, and what caused it.

These reports are very valuable in checking the maintenance work by comparison, and are also used in compiling information as to the efficiency of various parts of the equipment.

The storage batteries are maintained according to standard instructions issued by the A. T. & T. Co., which I believe are similar to those issued by several storage battery companies.

Underground Cables.

Underground cables, while considered as being little liable to trouble, are affected in various ways. Electrolysis is a condition which has to be constantly guarded against, and potential surveys of the underground cable have to be made at frequent intervals. The lead sheath is liable to be injured by electrolytic action of the return currents of electric railways or other direct current lighting or power systems. Cable sheaths are normally of very low resistance, hence foreign return currents are liable to flow through the cable sheath to a considerable extent, depending upon the resistance of the earth and of other neighboring underground conductors such as water and gas pipes. These currents finally leave the sheath to seek the best available return to the grounded terminal of the power station generators. Corrosive action is liable to occur at the point where the currents leave the cable and pass to the earth.

The general method of overcoming an electro-positive condition is to provide a conductor of sufficient resistance between the cable sheath, and a grounded power terminal or street railway negative return wire.

Aerial Cables.

Aerial cables are very convenient for distribution and permit the handling of a larger number of wires than would be possible otherwise. Less difficulty is experienced from crosses, interference by trees, etc., than would be found in open wire, but the aerial cable is not entirely free from trouble.

The cable in use at present is what is known as the "dry core" type. The wires are insulated with paper, and the chief thing to guard against is moisture. The splices are all protected by lead sleeves with wiped joints and, where the conductors are brought out for distribution, especially prepared compound is used to prevent the moisture from working back into the cable.

It naturally follows that the slightest abrasion or crack of any kind in the sheath will cause serious trouble; therefore, aerial cable systems must be constantly watched to prevent such damages. Great care is necessary to see that, where the cable passes through trees, the branches are either trimmed out, or moulding of some type covers the cable.

Loose hangers or a cable insecurely fastened to a cable box sometimes start a crack in the sheath. There is also the constant menace of the small boy with his rifle. Lightning has also caused a great deal of damage and, in some cities, the squirrels have attacked the lead cables and gnawed holes through them, causing damage. In the city of Madison we have any number of such cases where squirrels have eaten off the armor and have put several hundred telephones out of service for two or three days. Various schemes have been tried to prevent this trouble, but I do not believe any of them have been very successful.

Service Drops.

The pair of wires to the subscriber's house is really the most vulnerable of any of the outside equipment. It is practically the only part in a modern plant where the wire itself is exposed to the elements with only a rubber and braided insulation. The wire we use is 17 gauge, steel, copper-clad, the steel giving the strength and the copper the conductivity.

The wires are twisted or transposed and consequently the pair will not stand very much usage. The insulation gradually deteriorates, and when it has reached a point where the rainy weather affects the service, the drop must be replaced.

There is also considerable damage due to the fact that it usually is necessary in reaching a subscriber's house to carry the service drop through trees and, unless great care is exercised in the original installation, and close super-

vision given to the lines afterward, damage could occur through a very small amount of rubbing against a limb, which tends to put the drop out of service.

In most exchanges this is given especial attention, and inspections are made at frequent intervals to determine the condition of the drops and which require replacement.

Toll Lines.

Undoubtedly a most important part of the plant is the toll lines. A large amount of trouble could exist in an exchange without causing anything but annoyance to the subscriber, but a toll line out of order will have a direct influence on the business interests of a community, and must be repaired promptly. All employes have instructions to the effect that toll line repairs supersede all others.

The repairs are handled in practically the same manner as exchange troubles. Tests on all circuits and equipment are made every morning and trouble found is promptly cleared. During the day all defects noted by the traffic department in using the lines are promptly reported and trouble cleared.

The repairs made on toll lines are tabulated in practically the same manner as the exchange troubles. It might be of interest to know that the amount of trouble which actually occurred in Wisconsin with 5,677 miles of toll pole line, and 43,303 miles of toll wire line, during the year 1911, was 8,140.

For a record of exchange troubles, I have taken the city of Milwaukee and will give a list of the various kinds of trouble which occurred during the month of September, 1912:

Total subscribers	40,000
Total troubles at sub-stations	3,624
Total troubles on outside plant	623
Total troubles in central office	1,167

This makes a total of 5,414 troubles in all, or an average of about 135 troubles per thousand subscribers.

General Repairs.

General repairs bring up the question of depreciation, as the amount of general repairs necessary depends to a great extent on how rapid the depreciation has been. Various tables have been set up covering the depreciation of telephone plants, but there is such a wide variance in equipment of the same kind under conditions almost identical that it is rather a matter of considering local conditions largely. It must also be taken into consideration that the telephone art is really in its infancy, and some of the material and more modern parts have not been in use long enough to determine a fair average of depreciation.

I will give a few facts gathered from my personal observations on the depreciation of some parts of the equipment. These facts are based entirely upon my own observations and are not considered as the standard of any telephone company.

The oldest underground construction, to my personal knowledge, is 15 years old. This covers manholes, conduit, laterals, and underground cable. Aerial cable is approximately the same age.

Poles.—There are some poles standing today in Wisconsin that were set 15 years ago, while, on the other hand, I have seen toll poles replaced between Madison and Sun Prairie that became decayed so that they were practically worthless after being up for only six years.

Crossarms.—I do not remember ever seeing a creosoted arm in bad condition. The arms which are not creosoted sometimes last for 13 or 14 years.

Locust pins.—About 14 years.

Oak pins.—About five years.

Bare copper wire.—Sixteen years.

Insulated iron or copper wire.—Eight years.

You realize that these figures are the maximum ones; that is, exceptional cases of extremely long lines. The average in my mind would be considerably less.

Replacements.

There was a theory a few years ago that a pole line would depreciate uniformly, that is, all of the poles would depreciate at about the same rate, making it necessary to replace all of them at about the same time, which would amount to practically rebuilding the line all at once.

It was found from experience, however, that this theory did not work out in practice, as some of the poles in a toll line depreciate faster than others, due to the character of the soil, and the load on the poles, condition of the individual poles, etc.

After experimenting along this line for some time, it was found that the most practicable and economical way to maintain a toll line was to replace the poles and crossarms one at a time as they became depreciated, with the result that the line is kept in first-class condition at all times, permitting first-class service to be given, and obtaining the maximum life from individual parts of the plant.

Experience proved to us that it was necessary and advisable to make up a systematic plan of maintenance work on toll line and exchange plants, and it was decided that the best way to accomplish this result was to have an inspection made by competent men of all toll line and exchange properties in the state once a year.

The exchange force working on current repairs is expected to keep on glass and tie wire and make such necessary repairs as to keep the insulation in fairly good condition. The rest of the maintenance, consisting of replacements, both pole and crossarm, pulling up slack, trimming trees, straightening poles, etc., is done by repair crews, which cover practically all of the toll lines, and the exchanges by local forces where possible in the state, each year.

As soon as the roads become good in the spring, a thorough inspection is made by competent men of all of the toll lines, and a record on a proper form is made of exactly what work should be done to put the line in good shape. On some of the older lines a pole to pole inspection is made by digging around the butts of the poles and measuring the good wood left in the pole; on others a pick is used, without digging around the poles, and on others simply a less detailed examination is considered sufficient.

At the conclusion of the inspection of each line an estimate is made by the district plant chief, giving in detail the material and labor needed for the different parts of the work. Then, when all of the lines are inspected in each district, a complete estimate is made for the district and approved in the regular way.

Inspections.

The inspections are completed about the middle of May, the estimates are then made up and approved about the first of June, leaving approximately six months in which to do the work, before winter sets in.

The method of inspection is a problem that can only be worked out by experience, although there are a few general rules that may be laid down for the guidance of all inspectors.

Some of the district plant chiefs and engineers can tell from experience by simply looking at a pole whether or not it is decayed below the ground line, while with others it would be necessary to dig away the dirt in order to be sure. Again, some inspectors can tell by glancing at a crossarm without climbing the pole whether it is necessary

to replace it; while with others it would be necessary to climb the pole to determine this fact.

As a general rule, however, most of the crossarms are on the poles not exceeding 25 or 30 feet in height, and it is generally possible to tell from the ground, without climbing the pole, whether or not it is necessary to replace the arm. At corner poles, at railway crossings, or where the crossarms are on very high poles, it is considered advisable to climb the poles and inspect the arms.

Reinforcing Poles.

We are using at the present time the A. T. & T. Company's specifications for reinforcing poles, and have found that in a good many cases the poles can be reinforced to advantage by means of a stub, particularly where they are located in the open country. The saving in cost is greater in proportion to the height and size of the poles reinforced. Our general plan in connection with this is that where a considerable number of poles are to be replaced we will replace one and reinforce the next, using the top of the old pole as a stub, where possible.

Amount of Repair Work.

The following are the figures showing the actual repair work done for the year 1911 in the state of Wisconsin:

Total miles of pole line inspected	5,656
Total miles of wire line inspected	40,000
Total cost of inspection	$ 2,972
Estimated cost of work	$45,566
Actual cost of work	$42,765
Number of poles replaced	2,747
Number of crossarms replaced	3,917
Number of poles reinforced	1,377
Number of poles reset	1,151
Actual cost per pole mile	$ 7.56
Actual cost per wire mile	$ 1.07

Practical Suggestions for Long Distance Operating

Chief Operator for Kinloch Telephone Co., at Bloomington, Ill., in Paper Read During Operators' "School," Following Convention of Illinois Association, at Peoria, Points Out Many Possibilities for Improvement in Handling Long Distance Calls

By Miss T. Anne Barnes

Some of the necessary requirements of a good long distance operator are: A common school education, which aids her in spelling and writing; a good memory, which is invaluable, as it serves in case of disputed tickets and in being able to remember rates; accuracy, being sure you are right before filing away a ticket; energy, using every effort to get your ticket through and getting frequent reports when delayed for any cause; speed, keeping busy, not rushed spasmodically; tact, possessing the ability to assure the party that you are as interested as he is to get his call through; a voice that carries, an important asset, not a high pitched voice, but one low, deep and clear.

Some long distance operators' voices are overworked. They carry more than the ticket to the distant operator, anger, impatience and unnecessary words. Aren't you tired, physically and mentally after one of these efforts? And then the ticket is often "lost" or "cancelled" after all.

As all long distance operators are very much alike, in most ways, if they do not resent your anger and impatience in words, they just close the key and "let her wait till she cools down." Of course the patron must also wait until the offending operator is sufficiently punished. We forget that sometimes.

Operators' School Well Worth While.

A few weeks ago, the girls of McLean county learned in our school of instruction, conducted by Mr. Vivian, of Grand Rapids, Mich., some very simple phases of long distance operating, which we thought we always had known, and in reality we did know so well that we thought them of little consequence. I believe we should always pass on a good work when we can and I do not know of any better method of handling long distance traffic, than that given us by Mr. Vivian, which we have adopted in the Bloomington office.

I will pass on a few of his good thoughts as well as I can. In the first place I will tell you just how we were taught to record a "Sent" ticket. We receive the ticket from the party, in his own words, only asking such questions as are sufficient to make it unnecessary to recall him in order to secure additional information, or to hold a circuit longer than needful and also consume the receiving operator's time.

The ticket will show the following information: Number of the telephone; name of the party talking; name or number and address of firm and person desired; if person desired is not available, will anyone else do, or shall we "leave word;" name of town; if party called for has no telephone, is messenger O. K. and will calling party pay for same.

Here is one of the simplest phases of our work. How many of us ever "test" on a line before ringing out? We know we should, but do we? Here, again, is one of the "little things" we always knew, and it is occasionally forced home to us when our ear has to suffer. Then we wish that crazy operator would ever "test" her line before ringing out. Sometimes we give her a little gentle moral advice in such terms as "get off the line!"

The test. Before ringing out on a circuit, give the name of your town, for example: "Peoria, Are you waiting?" After three seconds, if there is no response, use the circuit. Then pass the ticket to the distant operator in the following way: Name of your office, number of party calling, name or number of party wanted, and such information as is necessary to secure the party.

Heretofore we have always taken the complete ticket on a "Through" call. Now we do not. If we are a switching point for some other point we take the name of town calling, and name of town wanted. That is all. If we are passing a ticket through a switching station, we pass it in this way—Name our station "Peoria wants Bloomington."

Importance of Each Toll Call.

A long distance call is a call upon which other business details of a day are often dependent. We should use the same spirit in our work as though each call we were handling were our own. I am sure if we always did, the percentage of lost calls would be greatly diminished. Unlike local work, each long distance call must receive individual attention.

In local work we do not notice what number is calling

and do not need to remember what number is called, after the connection is down. Local work becomes mechanical. Long distance work requires mental activity. How would you feel if you thought your long distance call was lying in a bunch of unfinished tickets—overlooked? There is nothing quite so annoying to a patron as to call long distance and inquire about a call placed when no one seems to know anything about it. Of course we have all had experiences of this kind. Sometimes it means lost patronage, and it always means lost confidence.

When an operator is relieved for recess, lunch or at the expiration of her time, she should leave all over tickets in such shape that the operator taking her position can go right ahead where she leaves off. The party should never be informed that his call has passed into another operator's hands.

A common saying of long distance operators is: "I didn't have your call. I just came." What difference does it make to the party calling, whether Mary or Anna took his call? He gave it to an operator of the company and not to any particular one. And does the party feel any better? No, he does not. And you are the one who gets the scolding, as he has to tell someone.

The "Getting Acquainted" Process.

Before we had our school in Bloomington we were curious to meet many of the out of town operators. After we had talked and eaten together we not only promised each other better business relations, but we also formed a clearer vision of the responsibilities of the small office operator. We did not realize she had much to contend with, outside of a few scattering long distance calls and her local work, her toll ledger and—a piece of fancy work. We know now that she has more general knowledge of her work than we do—starting as she does with the ticket, putting it through, keeping the books and collecting. (And we had supposed she was crocheting.)

Harmony between operators is a much discussed subject. It comes under the "shall" and "should" in every book of rules. But "shall" and "should" will never promote harmony. They will only check discord. I believe it would be a fine thing if there could be county schools of instruction semi-annually and then one big school annually. If these things can become realities the key note of harmonious business relationship will be sounded.

Men do not look for sentiment in business. With them it is a matter of buying and selling. The average man regards work as inevitable. He was told so in the beginning of the world. But women are different. They want to care for their work, or it becomes a burden to them. Most girls in telephone work are not there from choice, but because it was one of the few vocations open to them on account of a lack of business education. Women do not look on self-support as inevitable. But, if we ask for entrance into the business world, let us enter it in the spirit of workers. Perhaps we cannot look at work in a cold commercial way, as a man does, but we can put as much earnestness and enthusiasm in it.

Telephone Progress in Saskatchewan.

Since March 1, 1912, 84 new companies have been formed in Saskatchewan with an aggregate pole mileage of 1,366 miles, with 1,448 subscribers. The total for Saskatchewan now shows 336 rural telephone companies with 7,516 pole miles. The total number of subscribers is 7,980, which works out to a little over one subscriber per pole mile. The total capitalization is $1,006,035, or about $134 per pole mile and $127 per subscriber. In addition to rural telephone companies, there are 21 private Independent companies not included in the above. There are also five companies operating under the municipal telephone act, which is now suspended, says the Canadian Electrical News.

Rapid progress has been made during the present year in Three new lines are being built towards the Manitoba boundary which have been completed as far as Marchwell, Fairlight and Welwyn, respectively. The long-distance line long distance construction by the Saskatchewan government. which is under construction along the main line of the C. N. R. R., westward towards the Alberta boundary, has now reached Lloydminster. A similar line paralleling the C. P. R. R. has been completed as far as Gull Lake. The amount of construction completed since March 1, 1912, is about 800 pole miles and 1,572 wire miles. This gives a total for the province of 2,964 pole miles and 9,744 wire miles.

Handy Soldering Device.

Most of the outside plant men of the company may be seen these days carrying small galvanized "cans" which have a slit in the top, says a writer in Telephone Talk. This "can" is a simple soldering device, originated by local talent, and has been christened the B. C. Telephone Co.'s

Lineman Using Soldering Outfit.

Soldering Torch, to distinguish it from inferior styles of torches made from tobacco cans.

The object of the torch is to provide a quick method of soldering and does away with the slow gasoline torch. A candle is used as the heating unit and the splice to be soldered is laid across the slit in the top. The flame is applied directly to the splice and the soldering done on each side of the flame. The whole outfit costs only a few cents. It is six inches high by two and a half inches wide and one and a quarter inches thick. A drop from the top of a pole only serves to increase its usefulness.

The torch can be cleaned by taking out two small bolts and removing the lower part of the torch. Draught is scientifically provided for the candle, which can burn undisturbed in a brisk gale owing to the can being windproof.

It is hoped with the use of this device to eliminate loose connections which result so often in intermittent trouble. The soldering operation is simple and easy, but its importance in giving the subscriber a perfect line is being emphasized.

The Telephone Inspector and the Troubleman

Continuation of a Series of Articles Begun in the September 7 Issue of Telephony—They Deal in an Elementary and Explicit Manner With Many of the Problems Encountered by Telephone Men in the Operation of Small Exchanges

By A. E. Dobbs

THE "KR" LAW.

"I wish," Will remarked after George finished talking, "you would tell me about the difference between static and self induction."

"Well," he was answered, "I have not time this morning to go into a deep and learned explanation of the subject, but the easiest way to remember it is this: The static induction always comes either from the earth or from another wire. It is always in the opposite direction from that of the legitimate current, while the magnetic induction travels in the same direction, but a little behind its exciting current. These wave currents are at first very feeble and make no perceptible impression upon the main current unless the line is a very long one, when they may be so strong as to completely kill it. Thus a telephone as explained before, will talk through a non-inductive resistance of from 50,000 to 100,000 ohms, while at the same time it may be almost entirely shut off by a line resistance of only 4,000 ohms."

"Is there any way to measure that extra resistance?" asked Will.

"Yes," answered George, "it is measured by means of a sensitive reflecting galvanometer. The instruments for these measurements are very expensive and complicated, and the calculations somewhat intricate. But there are some general formulae by which the capacity of any line may be calculated. Then by multiplying this total capacity by the resistance, we get a formula by which we can calculate its telephonic resistance."

"What do you mean by telephonic resistance?"

"Haven't I told you several times that the inductive resistance of a magnet is many times its measured resistance?" George counter-questioned. "I have often tried to impress upon you that a rapidly alternating current in a circuit sets up an inductive resistance against itself, and that the more rapid the alterations, the higher this inductive resistance becomes. This explains why the loss on the power transmission line between Niagara Falls and Buffalo was so much greater than the engineers had originally calculated. On account of the high voltage used and the rapidly increasing volume of the current, the loss was such that it was necessary to make transpositions in the circuit at regular intervals. Now telephone currents are measured in millionths of an ampere, and consequently are not affected to the same extent as power currents would be, but at the same time, the loss is sufficiently great to become a serious factor in long distance transmission.

"In measuring this capacity, we use a unit called the 'microfarad.' Now, a No. 14 B. & S. wire will have a static capacity of .0144 of a microfarad per mile, that is, as opposed to the earth. It is not fixed, however, for it will vary considerably, being sometimes more and sometimes less, but that would be a fair average for a long line. With metallic circuits, however, the capacity of one wire against another in the open air is only about .00864 of a microfarad per mile."

Here George produced his notebook and told Will to copy the following table of capacities for different size wire.

"The sizes, you will notice," he continued, "are given the Brown & Sharpe gage, which, of course, is about two sizes smaller than the iron wire gage.

"Now, when the capacity given in the third column is multiplied by half the total number of miles in the circuit, and that in turn by the number of ohms resistance, and the product reaches 50,000, it is considered that the limit of *good* telephonic speech has been reached. In cable the lowest capacity that you can figure on, is .08 mf. per mile, that is for dry core, paper insulated cables. Rubber insulated cables would be about five times higher.

"It will be noticed that in the table the capacity of the wire increases slightly with its size. Thus the capacity of No. 8 B. & S. wire to earth is equal to about .0150 mf., and in ordinary commercial use it is safe for us to use that figure in calculations."

Size B. & S. Gage	Weight per mile, in Lbs.	Resistance, per mile, Ohms.	Capacity, to earth, in mf.	Capacity, wire to wire, in mf.
6.....	420.0	2.04	0.01562	.00936
7.....	333.0	2.60	0.01537	.00918
8.....	264.0	3.30	0.01510	.00990
9.....	209.5	4.30	0.01500	.00900
10.....	166.0	5.40	0.01480	.00880
12.....	105.0	9.00	0.01440	.00860
14.....	66.0	13.70	0.01420	.00840
16.....	41.0	22.10	0.01410	.00830

Table of Capacities for Different Size Wire.

"Say, that looks to me like a very slight difference," commented Will.

"The difference is not so slight as it appears when you come to measure up several hundred miles of it," answered George. "As an example, what would be the KR resistance of a line 500 miles long of No. 10 B. & S. copper wire? Copper wire of this size has a resistance of 5.4 ohms to the mile. A line 500 miles long means 1,000 miles of wire, so that its measured resistance, therefore, would be 1,000 x 5.4 or 5,400 ohms.

"Now let us suppose the K (capacity) factor to be as low as .0144 per mile, which would be low for wire of this size. Then we would have $500 \times .0144 = 7.2$ mf. Thus, we would have $5{,}400 \times 7.2 = 38{,}880$, which is well within the talking limit. With the capacity as high as .015, the total would then be $5{,}400 \times .015 \times 500 = 40{,}500$. Thus, you see that a difference of .0006 mf. would make a resistance difference equal to about 2,000 ohms on a line of this kind."

"Didn't you make a mistake there?" questioned Will. "I notice that in measuring the resistance, you took both legs of the line, making in all 1,000 miles of wire, while in measuring the capacity you only took one, or 500 miles."

"In measuring the capacity of a circuit, you only measure one side," replied George.

"But why do you take only half of the wire?" asked Will. "If your wire shows a capacity of .015 mf. to the mile, would not every mile of it count?"

"You have raised an interesting question, but there are several reasons for doing it. One is that half the earth K factor has been found a good working formula, which is reason enough.

"Let us suppose that the self induction of copper wire will take care of half the capacity on long lines. As transposition of lines affects this, let us suppose that the earth capacity is

nullified and that the only capacity remaining is that between wire and wire, which, as I explained before, is about half that of the earth capacity."

"Then, if self induction is a good thing, why not use iron wire?" argued Will.

"Because then your trouble from self induction would be a greater nuisance than the trouble from capacity."

Will Asks Many Questions.

"Could not that be balanced? How would it do to use iron on one side and copper on the other?" suggester Will.

"Why, then you would have a resistance of 1,000 ohms on one side and 5,000 on the other, which would throw the line out of balance, or else if balanced, the iron wire would be so heavy as to break the arm down."

"But what if you transposed from one wire to the other?" Will questioned, his interest being aroused. "Would not your resistance be equal? Or, how would it do in a long toll line to insert, say, one mile of No. 6 iron wire in every 20 of copper? It certainly seems that if you can balance capacity with self induction, you ought to be able to strike a balance somewhere."

"Do you think I'm a query box?" laughed George. "I'm afraid that your plan of joining iron and copper wires at frequent intervals would make trouble from bad joints, even though you soldered them well. Still your ideas are worth considering.

"This reminds me of a letter I received the other day from another old pal of mine. He says: 'I have a contract to construct five toll lines 80 miles in length from Jonesboro to Zenith. Now, my plan is to use No. 12 copper, building metallic circuits, but for 40 miles of the way, I should like to use cable, on account of trees and other difficulties. A cable would cost but little more than the bare wire, including arms, etc., and would be much less objectionable to residents along the road; besides, the maintenance would be much less. Now could this cable be made a success?'

"If I were engineering that toll line," said George, "I should insist on wire not smaller than No. 10 B. & S. copper and would pay a little more for the right of way with tree trimming privileges. All such cheap schemes make me tired."

"But would the cable work?" asked Will.

"I don't know. Let us see. He is probably figuring on the ordinary lead cable with No. 19 B. & S. copper wire, which has a resistance of 40 ohms to the mile. Therefore, the resistance of his circuit would be $40 \times 2 \times 40 = 3{,}200$ ohms, to which must also be added that of the 40 more miles of No. 12 bare wire, which has a resistance of about 8.5 ohms to the mile. That would be $8.5 \times 2 \times 40 = 680$ ohms, making the total resistance of his line, 3,880 ohms, which, allowing for joints, etc., would be 3,900 ohms. This, you will notice, allows nothing for induction coils or receivers, which are left out of the calculation.

"Now as to the KR law. We will suppose that the cable throughout has a capacity as low as .08 mf. per mile, which is about 5½ times that of the bare wire. We will, therefore, to equalize matters, extend our cable capacity one-sixth of the distance beyond the cable's end, or 47 miles. $47 \times .08 = 3.76$ mf. Now we have $3{,}900 \times 3.76 = 14{,}664$. Yes, such a line as that would talk, if used only between Jonesboro and Zenith. But when you build a long distance line, you must figure on talking half-way across the country, and a few more miles added to a line like this would soon reach the talking limit. Then the close proximity of these conductors would greatly increase the self induction and cross talk, even if the insulation could be maintained at 500 megohms to the mile.

"This law is called the KR law, and although its correctness has often been disputed, experience so far has shown that it is a good, safe, working law. American engineers in practice have even doubled its theoretical limits. While the KR law would limit telephonic transmission to about 1,000 miles, we have succeeded in more than doubling this distance."

"Now," said Will, who had not yet forgotten the original subject, "so much for the capacity. What about that self induction, which you told me was always opposed to capacity induction?"

"Well," answered George, "it will take me a long time to go into that subject fully, but self induction manifests itself in several different ways. The current passing over the wire, magnetizes it to a certain extent. These magnetic currents lag just far enough behind the original currents to be constantly meeting the wave that is following behind. You will notice that I am supposing that one wave follows another. That is not exactly correct, but it is the only method I can think of to explain it.

"There is another peculiar effect in connection with alternating currents which deserves notice, although it is practically negligible in telephonic transmission. It is called the skin effect. In this case the current seems to strike the outside first and soak in, as it were, toward the center."

"How do you know that?" questioned Will.

"It has been proven by elaborate tests many times and so thoroughly that we are also able to tell just how much retarding effect it has on the current" responded George. "This explains why it is that in lightning rods, where lightning discharges are of a high alternating character, a strip of tin two inches wide becomes more efficient than a solid rod one-half inch in diameter, although the measured resistance would be much less in the solid rod."

"Why would not a thin, flat wire be better for telephonic transmission than the solid copper wire that we use?"

"That has been tried, my boy, but there are mechanical difficulties to be overcome in stringing wire of that kind. We have something very much like this in the bi-metallic wire, in which the outside is copper and the core steel. In the past few years this kind of wire has come into extensive use. In cities No. 17 B. & S. copper-steel twisted pair wire is being largely used in place of No. 14 B. & S. copper twisted pair wire with satisfactory results, so I am told."

William is Promoted to the Switchboard.

"Will," said Mr. Wilson one Saturday evening, as William happened to be loafing in the back shop, "how would you like a change of scene for a few days?"

"It depends upon what it is," cautiously replied Will.

"Over there at the new exchange at Rover. I want you to do the office wiring."

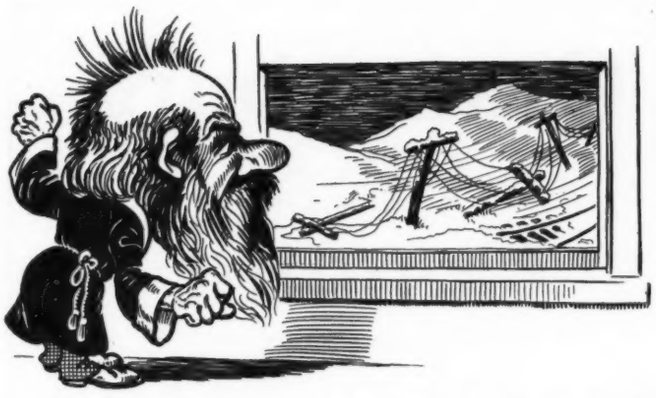
"Well, I would be glad of the chance," answered Will, "but you will have to stay by me to see that I don't make any mistakes. You know I have never had a chance to do any inside wiring here, and don't know anything about the cross-connecting board yet, as you have done all of that yourself."

"Pshaw," George spoke encouragingly, "the cross-connecting board is a simple affair."

"What is its use anyway?" questioned Will.

"The cross-connecting board," George explained "allows us to make changes in regard to subscribers and switchboard drops that we could not do conveniently in any other way. In the first place, the switchboard wiring, once connected, should never be disturbed. It would not do to unsolder the terminals and connections every time we wanted to use the drop for some one else, or when the subscriber changes his location. Neither could we arbitrarily change a subscriber's number, as a friend of mine in Canada used to do.

"He had his cable come right into the switchboard from the pole lines outside. Pin numbers and cable numbers corresponded, of course. Whatever cable number the subscriber was connected to, became his telephone number. If a conductor became faulty and it was necessary to change the cable num-



There's a Pessimist in

most every organization—and in *one* of the big Independent companies there's a regular "old he one."

Several years ago, this company strung some No. 10 Copper Clad to take care of a toll business which had out-grown a line of No. 9 copper—and the pessimist knew the Copper Clad wouldn't work and said so.

That winter there was a real sleet storm and in the middle of it, they told the pessimist that one of the lines was down. Was he happy?

He was—until they told him the No. 9 copper was down and the No. 10 Copper Clad was talking like a bell and holding up the poles.

Then he went out and ate a "sinker."—

Moral: Copper Clad is bad for pessimists. If you have one try it on him.

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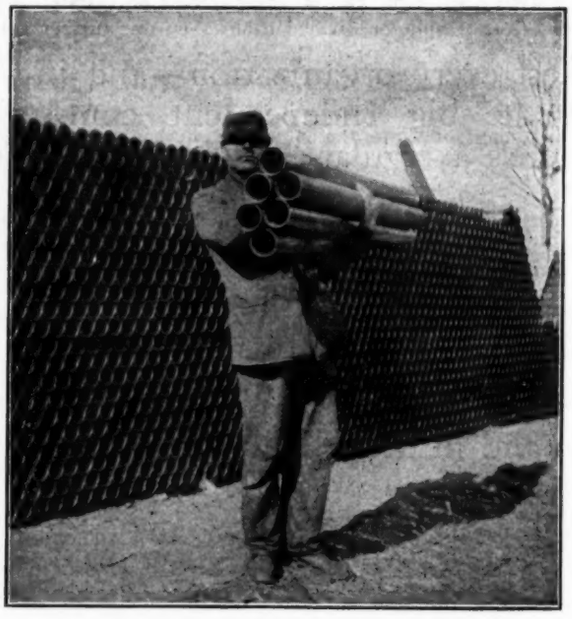

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ber his telephone number was changed also. This was in a small plant, however, with few changes and only about 130 subscribers. As the numbers were not changed very often, the system caused but little dissatisfaction."

"As his cables did not contain more than 100 wires, how did he arrange them?" asked Will.

"Well, he had only two short cables, and everything in cable No. 1 was numbered from 1 to 100, and everything in cable No. 2, from 100 to 200. Simple enough! This would not, however, do in a large plant, and I think most likely my Canadian friend dropped it long ago.

"On the cross-connecting board, all of our switchboard wires are brought to certain fixed terminals, the numbers of which are never changed. Our outside cable conductors likewise are brought to another set of terminals which are never changed. Then a short piece of flexible wire from the drop or switchboard number on the terminal to the desired number in the cable terminal, completes the connection.

"We will suppose that a subscriber's drop number is 100. His original cable numbers, supposing that he has a metallic circuit, might be 49 and 50 in cable No. 1. I will say right here that every cable leading out from the exchange should be numbered. Thus, No. 1 may terminate at a certain point on Arch street, No. 2 on Baxter street, No. 3 on Chester street. In the case of split or divided cable, they are further subdivided, as No. 1-*A*, No. 1-*B*, No. 1-*C*, etc.

"Now, this subscriber might change his location, perhaps no farther than one block, but still far enough to make it desirable to connect him into another cable. Perhaps the only spare conductors in cable No. 2 would be, say, 23 and 24. The only thing to avoid changing his telephone number, you can readily understand, would be to change the jumper wires at the cross-connecting board from the wire terminals 49 and 50 of cable No. 1 to 23 and 24 of cable No. 2. That would still leave his line connected to drop No. 100 on the board.

"It has always seemed to me that the rack type of cross-connecting board is the best, although, where space is limited, there are smaller and more compact arrangements which present a neater appearance. But my early training has always made me rather prefer convenience to mere neatness."

"What do you mean by a cross-connecting board of the rack type?" questioned Will. "We haven't that kind in this office, have we?"

(*To be continued.*)

Practical Telephony for the Practical Exchange Manager

A Series of Articles Relating to the Construction, Maintenance and Operation of a Moderate Size Telephone Exchange, Which Began in the Issue of September 21, Expressed in Everyday Terms, Easily Understood—Principles Easily Applied

By H. R. Van Deventer

In small offices, it sometimes occurs that all of the transmitters on the system apparently become noisy. When this happens corrosion of the battery leads or cell connections may be suspected.

Right here it is well to point out that in practically all common battery exchanges, the positive side of the battery should be grounded. There are some cases where the negative side is grounded instead of the positive, but these are rare. Grounding the positive side of the battery stops corrosion which will occur if it is attempted to operate the battery ungrounded.

In searching for corrosion of the battery leads and terminals, it is not sufficient to simply inspect them. They should be pulled and strained, so that if the corrosion is inside under a shell of varnish or under the covering of the wire, it will be made manifest. Usually the corrosion takes place on the positive lead and its connections, particularly at the lead plate of the storage cell.

In view of the corrosion which takes place at these points, it is customary to burn or solder the lead plates of the battery together and also to coat the copper terminals with lead and burn them to the terminals of the cell. In small installations, lead covered bolts are employed. In no case should brass or iron be used. In case of emergency, a brass or copper bolt may be employed, provided it is screwed up tight and all of the exposed surface painted with acid-proof paint. This should extend down the lead lug for at least half an inch to prevent creaking.

In circuits of the repeating coil type such as extensively used by the Bell company, the resistance of the battery leads is an important feature and it must be kept as low as possible or cross talk will result. Supposing the leads to be of proper resistance and that cross talk and particularly noise in the transmitters develops the leads should be examined for corrosion or other causes that would tend to insert a high or variable resistance between the battery and the switchboard. In the impedance type of circuit it is not necessary that the leads should be of such low resistance as compared with the repeating coil type, but any high or variable resistance in them will cause trouble.

These facts should be kept in mind when working on

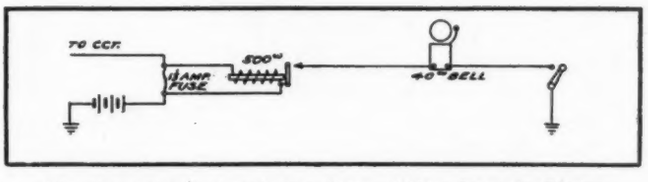


Fig. 39. Circuit for Giving Alarm When Fuse Is Blown.

the leads, especially in branch exchanges using a battery on the same premises with the board. Such an outfit will give trouble if battery leads are too small, or improperly attached to the cells, or if low capacity fuses are used, and especially screw fuse plugs, as ordinarily used for electric light work. The battery fuses should be either of the tubular type so arranged that there is no question as to good contact being secured between the ferrule of the fuse and its associated clip, or link fuses having tips which are inserted under screws.

To eliminate trouble caused by fuses blowing, it is customary to use a fuse alarm circuit as shown in the accompanying diagram, Fig. 39. This is easily made up from an old strip of drops. The windings should be at least 500 ohms. The drops are connected across the fuse terminals as shown. It is obvious that if the fuse is blown, the circuit is re-established through the drop winding, thereby causing the drop to operate and close its night bell contacts, thus giving an audible alarm. This arrangement is especially valuable in connection with fuses on trunk and other circuits, which could remain in trouble for quite a while without detection.

(*To be continued.*)

Out of the Mail Bag

We received a letter the other day which reads as follows: "Herewith our check to settle our subscription to TELEPHONY to date. Our lineman is taking the paper and as we do not need the other copy please discontinue sending it."

This letter caught the eye of J. C. Kelsey, who had called at the office, and, as he read it, he snorted: "There's generosity for you! The company discontinues its own paper and uses the lineman's. Why didn't the fellow who wrote that letter offer to pay for the lineman's paper? I see the writer lives in Kansas. I'm sorry for that, as Kansas is my state, and I hate to think a Kansas man could be as small as that."

Economy is a wise thing. All the old sayings—like "Look out for the pennies and the dollars will look out for themselves," etc.—have helped many a man to pile up a fortune, and, what was better for him, kept him from harmful extravagances. At the same time there is a false economy that proves mighty costly. You know the story of the man who saw a pin in the pathway. He remembered the old saying: "See a pin, pick it up, and all day long you'll have good luck." So he stooped to pick up the pin. His new derby rolled off his head into the dirt, his eyeglasses fell to the walk and smashed, and he broke off two buttons on his trousers. By that time he had forgotten about the pin, all but to curse it. Maybe the Kansas man who wrote that letter isn't stooping to pick up pins. It is probable he has his lineman do it for him.

The Public Square at Nogales, Mexico, Where Federal Forces Surrendered.

The new serial by the author of the "Uncle Dick" practical letters will begin after the "The Inspector and the Troubleman" is concluded. It is impossible to state now just when this will be. "Uncle Dick's" new serial will be of engrossing interest to all telephone men, and will furnish many valuable hints on the solving of the many, many problems that are constantly coming up to vex and perplex the exchange manager. The title of his first chapter will be: "The Rejuvenation of the Cranesville Telephone Exchange"—a story of how a run-down exchange was re-built, enlarged and changed successively from grounded to a metallic system and later to a common battery plant.

Readers of TELEPHONY will be intensely interested in this new series of articles which is confidently believed will prove to be one of the most useful ever printed for telephone men.

The accompanying illustration shows the plaza, or public square, at Nogales, Mexico, and was reproduced from a picture sent TELEPHONY by C. W. Forbes, the former Chicagoan, who is now manager of the Hermosillo exchange, in Sonora. Mr. Forbes was at Nogales, and states that the plaza herewith shown is where the Federal forces in the Mexican revolution surrendered.

"I appreciate TELEPHONY, and enjoy it very much," writes J. A. Seals, of the Inter-State Independent Telephone & Telegraph Co., at Aurora, Ill.

In a letter enclosing his check for his 1913 subscription, S. S. McCoy, of Varna, Ill., says: "We could not do without TELEPHONY, as it has value in the telephone business for the troubleman and manager."

"I am much interested in TELEPHONY, and do not want to miss a copy," writes J. C. Walker, of the Stephenville (Tex.) Telephone Exchange.

"Enclosed please find money order for which send your paper in 1913," writes H. Wheaton, of Columbia, Iowa. "I cannot get along without it."

W. D. Cleveland, foreman of telephone and telegraph of the Spokane, Portland & Seattle Railway Company, writing from Portland, Ore., says: "Enclosed find money order for which please renew my subscription for 1913, as I think yours is the most instructive trade journal published in the world pertaining to railroad telephony. This branch of telephony is only in its infancy, and according to figures that I have gathered from your paper the number of railroads that have accepted the telephone has more than doubled in the last year. I trust that in place of a section being devoted to railroad telephony twice a month, it will be in every week's edition, and that we have more pictures of installations so we may see what the other fellow is doing."

In an interesting letter about general telephone conditions, Maurice Howard, of Chesham, England, expresses his admiration for the progress made by the Independent companies of the United States and "wishes them success in fighting a monopoly that has not carried out its elementary and primary duty to the communities whose dollars it has been after. I feel deep sympathy for those who have suffered loss in the storms and floods in Nebraska, Ohio, etc. I was just reading of the brave 'Hello girl' at Dayton, O. I guess she was an Independent all the time."

Another English subscriber, Edward Higson, of Oldham, in writing in requesting a change of address, says: "I shall look forward to reading the very interesting and valuable matter found only in your journal."

F. M. Boardman, manager of the Story County Independent Telephone Co. at Nevada, Ia., writes: "I wish to compliment you on the character of the articles that you have been running in TELEPHONY of late. Mr. Kelsey's articles are always to the point, and the series by Mr. Van Deventer has been extremely good. His article on plant maintenance and operating charges fits the case exactly for the average small plant like ours, with four or five exchanges and a capital of $100,000 or less. *Our local managers at our exchanges all say they derive much benefit from* TELEPHONY."

That last sentence is significant. It shows that the telephone men in the field appreciate TELEPHONY, and needless to say, it is most gratifying to the editors to know their efforts are approved.

"I like TELEPHONY and consider it a very instructive magazine for telephone men," says W. D. Reneau, of McDonald, Kan.

J. H. White, of the Christian-Todd Telephone Co., at Allensville, Ky., writes: "Enclosed find check to renew my subscription to TELEPHONY, for I would be lost in the telephone business without your paper."

From Factory and Salesroom

Publicity Department for Automatic Electric.

The Automatic Electric Co., of Chicago, announces the establishment of a separate department of publicity and advertising and has placed in charge of it N. P. Bartley, formerly of the staff of the Buffalo News. The aim of this department will be not only to bring to the attention of the telephone public the advantages of automatic telephony, but to promote in every way possible the interests of the Independent telephone movement in America.

Mr. Bartley is a new man in the telephone field, but comes to his task well equipped to meet its requirements. He spent some time in the civil service of the Philippine Islands studying economic and public utilities problems in that country, and later was engaged in newspaper work in various capacities. His most recent activity was as assistant Sunday editor of the Buffalo News.

TELEPHONY takes this occasion to welcome Mr. Bartley to his new work and extends to the Automatic Electric Co. and to him its best wishes for success.

Change in Spelling of Matthews' Specialties.

W. N. Matthews & Brother, of St. Louis, have decided that in view of the fact that most of their customers call their cable fault finding instrument a Matthews Telefault instead of Matthews Telafault, to substitute the *e* for the *a* and call it Matthews Telefault in the future.

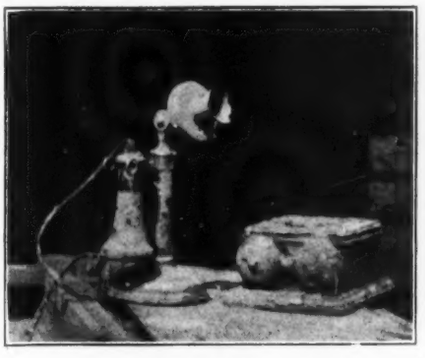
The same will hold true for Matthews Teleheight, which was described in TELEPHONY two weeks ago and Matthews Telepipe. The latter is an instrument similar to Matthews Telefault, but is especially designed for the location of metal pipes, of all kinds, which are not more than 12 feet underground.

Flood Work of Kellogg Switchboard & Supply Co.

When the first intimation of the extent of the recent flood reached the office of the Kellogg Switchboard & Supply Co., that company immediately got together as much information as necessary, covering types of apparatus used in the flooded district and a representative, L. C. Morris, left for Columbus by first train. The Kellogg company's idea was that Mr. Morris could assist Mr. Woodbury, the company's representative for that territory, to help customers in the matter of testing and rebuilding their damaged equipment, and in rush shipping service. Temporary flood headquarters were established in three cities located in different flooded sections, in addition to the regular offices at Columbus and Cleveland.

The water had barely left the streets of Dayton before the Kellogg company had opened its first quarters at that point, assisting customers in every direction out of Dayton. Long distance telephone communications over Independent lines was a reality to nearly every point, even when water was at its height.

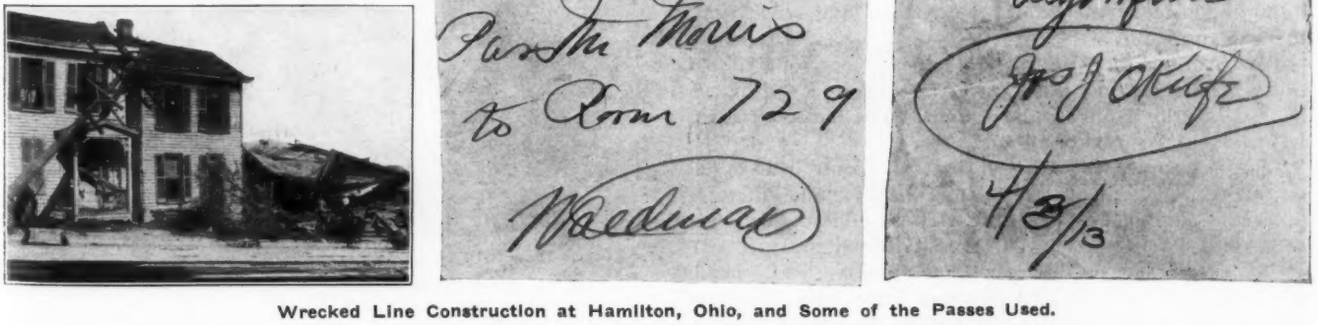
The accompanying illustrations are from photographs taken by Mr. Morris at Dayton, Columbus and Hamilton. One illustration shows a Kellogg desk stand which had been buried under mud and water for three days. It was necessary to knock off the crusted mud to show even the outlines of the stand. The view showing the wrecked line construction was taken in Hamilton, but gives a very faint idea of the real conditions following the catastrophe.



Kellogg Desk Stand After Mud Bath.

While taking photographs at Dayton, Mr. Morris had to go through the formalities of explaining his presence in Dayton to a very inquisitive officer of the guard. Several cities were under martial law and the situation can perhaps be imagined when it was necessary to carry two hotel passes and one army pass. The Dayton Daily News indicated its activity in erecting a press stand in the middle of the main streets, in an effort to locate the missing and spread news to anxious relatives and friends.

Mr. Morris tells of several interesting incidents in connection with the flood and its after effects, especially relating to the difficulties in getting about and the handicap under which hotel people tried to serve their guests. He tells of one incident where a car load of hams for the relief of the flood sufferers was being unloaded by a city official without the authorization of the relief committee. A search of the city official's home brought to light eighteen hams. Caught in the act the man finally confessed his purpose and although temporarily jailed and sentenced for



Wrecked Line Construction at Hamilton, Ohio, and Some of the Passes Used.

60 days, was finally released and drummed out of town between a file of soldiers, to the merry thrill of an army fife.

Phoney Bill the Whole Parade.

Phoney Bill will show his usual class in May, according to the new monthly calendar blotter of the Stromberg-Carlson

Phoney Bill Beating It Hard for Stromberg-Carlson.

Telephone Mfg. Co. May is the month of parades, circus and others, and Phoney Bill will be in line with his cheerful optimism, playing an important part in the march of events. Looking at the accompanying illustration taken from the new May blotter, it might be surmised that Phoney Bill is the whole parade. Phoney Bill's sentiments this month are typical, for he says: "Beat it for Stromberg-Carlson."

The L. & N. Portable Testing Set.

The new Type S, portable Wheatstone bridge testing set, which was exhibited and favorably commented upon at the Chicago convention of the National Independent Telephone Association, is now being placed upon the market by the makers, the Leeds & Northrup Co., of Philadelphia. With this instrument, it is said, resistance measurements may be made throughout a wide range. It is especially designed, however, for use in locating grounds, crosses, etc., in telephone and telegraph lines and cables. The principal features of the set are low price (this without any sacrifice of standard Leeds & Northrup quality), small size, light weight, convenience of manipulation and sensitivity of the galvanometer.

The instrument is shown in the accompanying illustration. Its dimensions, when closed, are 7⅜ in. x 8¾ in. x 4½ in. Its weight is only eight pounds. The makers have the following to say regarding it:

"The resistances in the set are all controlled by dial switches. All contacts are within the box and, therefore, protected against dust and dirt. These contacts are easily accessible for inspection. The contact switches are made up of several 'leaves' of phosphor bronze, each making independent contact. The switches have been very carefully designed and constructed and no fear need be entertained of trouble being caused by their failure to make good contact.

"The switch contacts are controlled by rubber heads on the top of the box. These heads present surfaces which are entirely rounded so that the operator's fingers are not made sore after continued use of the instrument.

"The ratio coils are controlled by one dial, thus eliminating a source of confusion which exists in other testing sets in which two dials or two sets of plugs are used for the control of the ratio coils. In the latter type of sets the two arms are commonly termed A and B arms. Very often an inexperienced operator, and sometimes an experienced one, is at a loss to know whether the ratio to be used is A/B or B/A. With the arrangement used in the Type S set, the ratio dial always gives directly the value of the multiplier.

"The accuracy of adjustment of the coils in this set is as high as in the more expensive bridges, namely 1/10th of 1 per cent. in the rheostat and 1/20th of 1 per cent. in the ration. These figures are guaranteed. As a matter of fact, the coils are all adjusted in the laboratories of the makers to twice the accuracy stated above. An important feature in connection with the resistance coils is the fact that they are all wound upon metal spools. This not only makes the coils more permanent in their adjustments, but also protects them against being burned out, as they can carry heavier currents than coils wound upon wooden spools.

"The galvanometer is the new Leeds & Northrup interchangeable type. It is guaranteed to have a sensitivity of one megohm. This means that one volt impressed across the terminals of the galvanometer through a resistance of one megohm produces a deflection of one millimeter. This sensitivity is at least 25 per cent. higher than in other portable galvanometers used for the same purpose. The moving system of the galvanometer is contained in a separate unit, which may be readily removed from the set should repairs ever be necessary. The galvanometer is exceptionally rugged, however, and will withstand considerable rough handling.

"A battery of four dry cells is contained in the set. Should it be desired to use an external battery, the internal battery may be thrown out of circuit by means of a small

The New Type S Portable Testing Set.

switch and the external battery connected between posts provided for the purpose. Similarly, an external galvanometer may be used, if desired. Switches are provided for changing the internal connections of the instrument, permitting the set to be used either for resistance measurements or for the Murray or Varley loop tests.

"For the advantage of those not thoroughly acquainted with the methods of locating grounds, etc., on lines and

cables, we give an example of using this set in such work. We will assume that a conductor in a cable 8,995 feet long is grounded. A second conductor is chosen from the cable, this conductor being clear. The good and bad conductors are then joined at opposite ends of the cable. The free ends of the conductors are now joined to the posts on the instruments marked X_1 and X_2. The two small double-throw switches are set for the Murray loop test, which we will use in this case. The ratio dial is set at the point marked M 1,000, and the rheostat is then adjusted so that there is no deflection of the galvanometer. Suppose the rheostat reading to be 450. Then distance to fault

$$= \frac{2 \times \text{length of cable} \times \text{rheostat reading}}{\text{rheostat reading} + \text{ratio dial setting}}$$

$$= \frac{2 \times 8995 \times 450}{450 + 1{,}000} = 5{,}583.1 \text{ ft.}$$

"If the length of the cable is not known, the resistance to the fault is found just as easily as the distance in the above example. The distance is then determined from the resistance, and the resistance per foot of the conductor under test as determined from a wire table.

Faults may be just as readily located on overhead lines provided there is available a good conductor paralleling the faulty line.

The makers fully describe the Type S set in bulletin No. 530, which will be sent to interested parties upon request.

Protection Against Lightning and High Potential Current.

The arrival of the spring and summer season when thunder storms are prevalent with their accompanying discharges of lightning, brings to the attention of managers of telephone lines, the importance of adequate protection of telephone equipment. Safety under the worst conditions and good service under all conditions, are demanded by the conscience of the manager and the reasonable expectation of the subscriber. This fact was set forth with considerable affectiveness in a recent advertisement in TELEPHONY, calling attention to a lightning arrester the merits of which should be carefully considered by the official who would like to be in position to give a satisfactory answer to the question "What if it should storm tonight?"

Vac-M Arrester.

The important claim made for this lightning arrester, which is shown in the accompanying illustration, is that it cannot become grounded and yet provides absolute protection against static and against high tension electricity even to voltages as low as 500 direct current. This arrester, known as the "Vac-M" (vacuum), consists of a hermetically sealed glass globe in which electrodes are mounted and connected with wires leading to the outside of the globe. The globe is mounted on a porcelain block which is a "removable unit" and is used in connection with another porcelain block designed as a "terminal block." The latter is provided with three binding posts and jaws which receive clips and a yoke on the removable unit thus enabling a mechanical and electrical union to be made at will.

The interior of the globe is a vacuum and therefore has a very low resistance to the passage of currents against which protection is sought. This permits a wide gap between the grounding element and the wires to be maintained, but discharging the current at voltages down to 500 volts direct current except where, on telegraph and similar circuits the battery or power circuit is fed through a relay resistance that permits but a small ampere flow. Tests with a micrometric air space in parallel with this arrester are said to have shown that a 1-8 inch gap in the vacuum is equivalent to .001 inch gap in the air and that a 3-16 inch gap in the vacuum is equivalent to about .002 inch in the air.

With the wide gap employed, the arrester, it is stated, cannot become grounded by carbon particles torn off by a heavy discharge. It is sensitive to static as an air gap of 1-500 of an inch or less, it is claimed, and will discharge static caused by sand storms or similar occurrences or by parallelism with high tension transmission lines, all without any interference with service currents.

Another interesting fact is that this arrester will remove static caused by wireless interference. This is illustrated by an experience with an installation of these arresters on the terminals of the American District Telegraph Co., at Cleveland, Ohio. Before the arresters were installed much trouble was experienced on these lines from wireless interference, especially from lake passenger steamers lying in the Cuyahoga River. After installation of the arresters, the only evidence of the effect of the wireless was seen in the flickering violet glow in the arresters at the time of the working of the ship's instrument, and it no longer interfered with the lines or instruments. Curiously enough an experienced telegraph operator could read the ship's messages by following the violet light in the arresters. Another feature of the gap in these arresters is that it is not composed of a substance which electrolysis can change in a short time into a conducting medium and hence put the line out of service, or permit an escape of current that may cause an annoyance because of the difficulty in locating it.

It is evident that an arrester which cannot become grounded affords an opportunity to do away with one of the large items of repair expense on low voltage electric systems such as telephone lines, whether city exchanges, rural, toll lines or privately operated systems and also on telegraph lines. A line with grounded arresters remains in trouble until the difficulty can be located and corrected by the repairman and this work is apt to prove a considerable item of expense in the course of a year. On the other hand an attempt to avoid grounding troubles by using a wide air gap is dangerous for the reason that if the gap is wide enough to obviate the difficulty, 500 volts will not jump the gap and therefore in case of a cross with the average trolley wire, the telephone line remains unprotected. This difficulty appears to have been solved very effectively in the "Vac-M" lightning arrester, which is put out by the National Electric Specialty Co., of Toledo, Ohio.

Finds Stewart Bros. Test Set Invaluable.

A telephone company in Ohio which has been using one of the test sets manufactured by Stewart Bros., of Ottawa, Ill., writes that with this set it can go right to the trouble every time, that the set saves no end of work and that the company would not be without it at any price. Stewart Bros. state this letter is but one of many similar endorsements received from users of their testing sets and that repeat orders are coming in all the time. The company is just issuing some new spring literature regarding the Stewart test set and has been getting together some good ammunition in the way of a long list of satisfied users of the device.

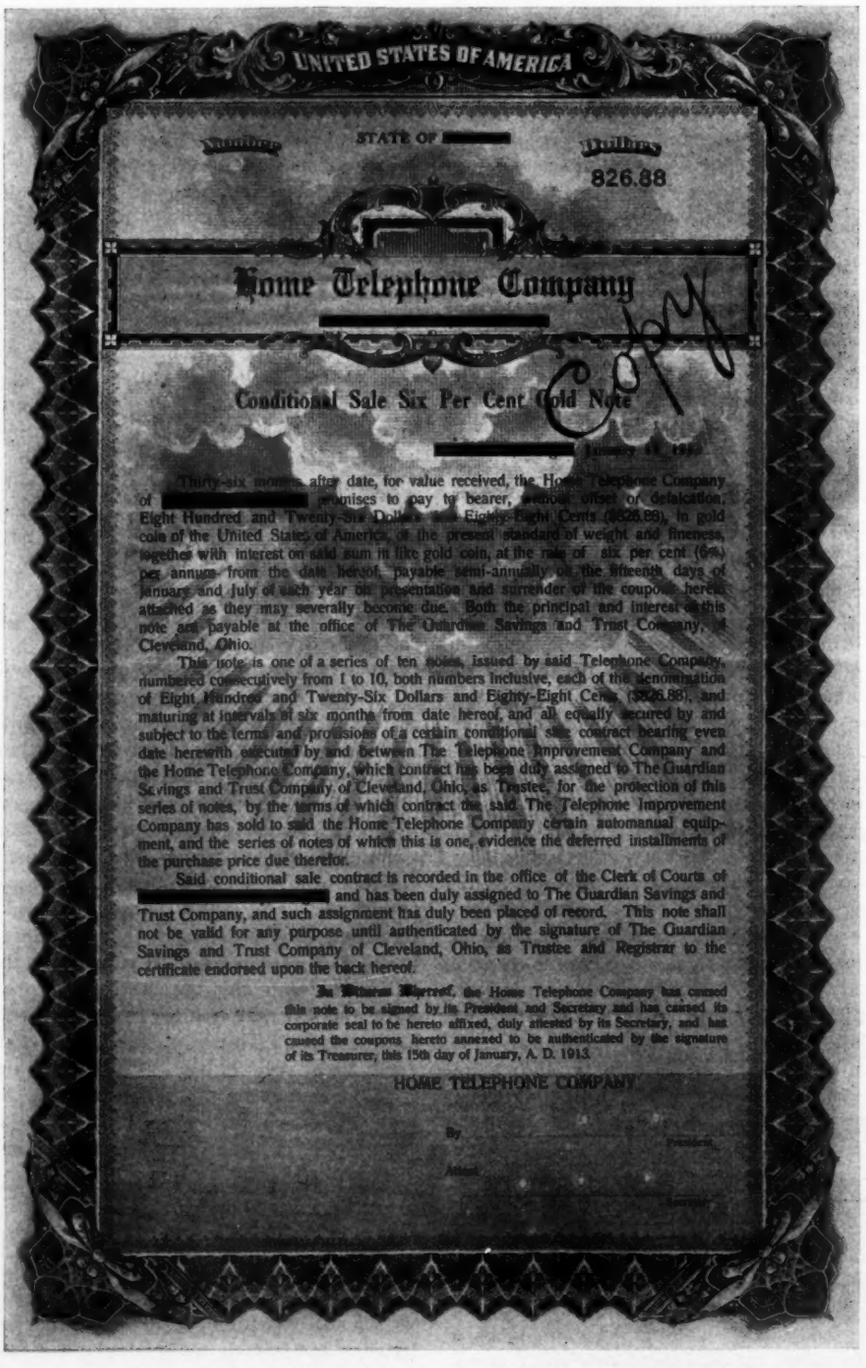
W. JACKSON BELL, owner of the Friendship Telephone Co., Friendship, Wis., has changed his headquarters from Friendship to Oxford, Wis., where he will establish his rebuilt telephone and supply business.

A New Security Worth Investigating.

Reproduced on this page is the front page of the Automanual trust certificate, issued by the Telephone Improvement Co., of Chicago, in connection with the installation of Automanual equipment, when desired. It is used particularly in the re-equipment of central office exchanges, when the capital stock of the company can not be conveniently increased, or other securities issued to secure funds. It is a plan said by the company to appeal to the money market as being particularly desirable.

It is proposed to contract with any operating company desiring to purchase Automanual equipment to deliver and install the Automanual system on a cash payment of 25 per cent. of the contract price. The balance of the purchase price will be represented by these telephone equipment trust certificates, bearing 6 per cent. interest, covering a period of 7 years, 1/84 part of which balance shall become due each month. It is believed that the savings alone, through the employment of Automanual, will be sufficient to meet such monthly payments. Upon the payment of the eighty-fourth certificate the title to the apparatus will pass to the operating company.

Arrangements have been made by the Telephone Improvement Co. to dispose of the telephone equipment trust obligations, thereby enabling operating companies which need new central office equipment to acquire it without serious embarrassment to either party.


UNITED STATES OF AMERICA

STATE OF [redacted]

826.88

Home Telephone Company

[redacted]

Conditional Sale Six Per Cent Gold Note

[redacted] January 14, 1913

Thirty-six months after date, for value received, the Home Telephone Company of [redacted] promises to pay to bearer, without offset or defalcation, Eight Hundred and Twenty-Six Dollars and Eighty-Eight Cents ($826.88), in gold coin of the United States of America, of the present standard of weight and fineness, together with interest on said sum in like gold coin, at the rate of six per cent (6%) per annum from the date hereof, payable semi-annually on the fifteenth days of January and July of each year on presentation and surrender of the coupons hereto attached as they may severally become due. Both the principal and interest of this note are payable at the office of The Guardian Savings and Trust Company, of Cleveland, Ohio.

This note is one of a series of ten notes, issued by said Telephone Company, numbered consecutively from 1 to 10, both numbers inclusive, each of the denomination of Eight Hundred and Twenty-Six Dollars and Eighty-Eight Cents ($826.88), and maturing at intervals of six months from date hereof, and all equally secured by and subject to the terms and provisions of a certain conditional sale contract bearing even date herewith executed by and between The Telephone Improvement Company and the Home Telephone Company, which contract has been duly assigned to The Guardian Savings and Trust Company of Cleveland, Ohio, as Trustee, for the protection of this series of notes, by the terms of which contract the said The Telephone Improvement Company has sold to said the Home Telephone Company certain automanual equipment, and the series of notes of which this is one, evidence the deferred installments of the purchase price due therefor.

Said conditional sale contract is recorded in the office of the Clerk of Courts of [redacted] and has been duly assigned to The Guardian Savings and Trust Company, and such assignment has duly been placed of record. This note shall not be valid for any purpose until authenticated by the signature of The Guardian Savings and Trust Company of Cleveland, Ohio, as Trustee and Registrar to the certificate endorsed upon the back hereof.

In Witness Whereof, the Home Telephone Company has caused this note to be signed by its President and Secretary and has caused its corporate seal to be hereto affixed, duly attested by its Secretary, and has caused the coupons hereto annexed to be authenticated by the signature of its Treasurer, this 15th day of January, A. D. 1913.

HOME TELEPHONE COMPANY

By [redacted] President.

Attest [redacted] Secretary.

The Trust Certificate Introduced by the Telephone Improvement Co.

The plan is not a new one, steam and electric roads having used it successfully for the past 20 years in the purchase of rolling stock. Regular interest coupons constitute a part of the certificate, conforming generally to the bond plan of the railroads.

The Telephone Improvement Co. will be glad to elaborate fully upon the method of application and solicits inquiry from companies planning the replacement of their central office equipment.

Mastic Flooring.

The modern industrial establishment, with its complex machinery, elaborate factory systems and skilled operatives, offers a noteworthy example of evolution from crude and inefficient methods. Not only have mechanical devices been developed to a high state of perfection in the past few decades in order to keep pace with competition, but changes of equal importance have been wrought in the construction of factory buildings, with the object of contributing to the safety, comfort and efficiency of the operatives.

Among those details which have received the attention of experts is the subject of flooring. The problem of flooring the factory is a difficult one, but many obstacles which present themselves in the average plant seem at last to have been overcome by a flooring material known as J-M Mastic.

The flooring is claimed to be unequalled for factory and warehouse use, even under the heaviest trucking conditions, and on account of its noiseless character is especially adapted for plants where there is considerable trucking. Another feature in its favor is the peculiar holding quality for preventing slipping, which it is said to possess. J-M Mastic Flooring, it is stated, provides a surface that is water proof and at the same time practically wear-proof under ordinary service conditions. It is also said to be unaffected by acids, alkali, brine, and other fluids of like nature.

Another claim made for this flooring is that it will not originate dust, a point of vital importance in establish-

ments where it is imperative to keep machinery and goods free from dust.

The base of the flooring is asphalt mastic, a product in which a finely graded mineral aggregate is bonded together by an asphaltic cement or binder. The mineral aggregate in the material, as made up, will pass through a wire screen ranging from 80 to 200 mesh in fineness.

The J-M Mastic Flooring can be made in any consistency between extreme hardness and softness and, while always dense, is said to possess a certain amount of resiliency. The manufacturer states that as it does not cause footsoreness and fatigue like concrete and other non-yielding floor surfaces, it adds greatly to the efficiency as well as to the comfort of employes in machine shops, factories and other industries, who are compelled to stand while at work. It can be laid over any foundation which is firm and stable, and may be applied over wood, brick, concrete or tile already in place.

The Mastic flooring is easily repaired, it is said, if changes in the floor surface are made necessary at any time. It adds very little to the dead load, as the standard thickness of 1½ inches weighs only 18 pounds to the square foot in place. This thickness is sufficient for ordinary trucking requirements but can be varied to meet conditions, ranging from one inch for lavatories, where the requirements are very light, to three inches in thickness for loading docks where the requirements are correspondingly severe.

J-M Mastic Flooring is said to be perfectly adapted for cold storage plants, dairies, laboratories, machine shops, railroad stations, school houses, institutions, etc. In fact, its scope is almost without limit. It is claimed to be superior to wood, concrete, brick, tile, slate or composition floors.

The H. W. Johns-Manville Co., New York, manufacturers of J-M Mastic, will be glad to send a booklet to anyone interested in the subject of flooring. This concern maintains a thoroughly equipped engineering department which co-operates with engineers and architects in handling flooring and waterproofing work of every nature.

Stromberg-Carlson Strengthens Its Sales Staff.

Two well equipped salesmen have been added to the sales staff of the Stromberg-Carlson Telephone Mfg. Co., one having returned to the company after a year's connection with

N. W. Baldwin.

W. C. Freeman.

another concern and the other having grown up in the company's organization at Rochester, N. Y.

W. C. Freeman, formerly Ontario branch manager at Toronto for the Stromberg-Carlson Telephone Mfg. Co., and for the last year salesman for the Century Telephone Construction Co. in Canada, has re-entered the Stromberg-Carlson Rochester sales department to take up important territorial sales work. Mr. Freeman's practical engineering and sales experience, covering a period of eight years, makes him especially fitted for the important work assigned to him. While in Canada he did considerable telephone engineering work in connection with the Hydro-Electric Power Commission and installed Stromberg-Carlson apparatus in the power stations of that great system. He has many friends in the company and in the trade who wish him success in the furthering of the company's interests through his efforts.

The training of a salesman with eight years' experience in the Rochester factory makes N. W. Baldwin particularly fitted for his new position. Mr. Baldwin was brought up in the Stromberg-Carlson organization at Rochester and now goes into the west to further the company's interest wherever it seems advisable to send him. He will visit Minneapolis and then take up active work in North Dakota and South Dakota. His strong, pleasing personality and knowledge of "Quality Apparatus" should make him welcome and acceptable to all telephone people in the territory. TELEPHONY is glad to make Mr. Baldwin's acquaintance and wishes him success in his new work.

His Name is a Misnomer.

Down in Indiana the Indianapolis Electrical Supply Co., an agency of the Ericsson Mfg. Co., of Buffalo, N. Y., has a salesman named Chill. Nearly every telephone manager in the state knows Chill. A story is told of his standing on a corner when the thermometer was six above just to uphold his name. It is bad enough to keep an engagement with a person named Chill in the summer time, but in the winter he should be stood up. But for all that his name implies, Chill is hailed without a chill wherever he goes, and he certainly gets the business. His customers all get their orders ready when they see him coming and, incidentally, put the cuspidor in the middle of the floor, as Chill likes a "chaw" of tobacco when talking about Everlasting All Steel telephones. The next time he comes around, get him to tell you about standing on the corner at six above.

In May a telephone convention is to be held in Indiana and Chill will undoubtedly show his friends some new stunts as he did in Chicago at the National convention. There he pulled off a good one when he put his hands in his pockets for his gloves and pulled out a pair of wet towels (some magician) and he is still looking for the person who put the towels in his pockets.

Everyone who attends the Indiana convention will find Mr. Chill there with his All Steel exhibit.

Manhattan Electrical Supply Company Elect Officers.

The directors of the Manhattan Electrical Supply Co., New York, recently held a special meeting to fill the vacancy in the office of president of that company, caused by the recent death of H. T. Johnson. At the meeting J. J. Gorman was elected president and B. H. Ellis, treasurer of the company, was also elected vice-president. Mr. Whitmore, Mr. Pierce and Mr. Manger will continue in the offices held by them for so long.

An Economical Pole Changer.

The Current Electric Co., 18 E. Kinzie street, Chicago, reports enthusiastically concerning its standard pole changer and the esteem it has won in the opinion of telephone companies. Many expressions of satisfaction have been volunteered by managers who say they have settled the pole changer question once and for all by adopting the "Standard," which has been operated for over two years on one set of dry cells.

The simplicity of operation of this pole changer, it is stated, obviates frequent adjustment and insures accurate performance at all times either on alternating or direct

pulsating current ringing. The Current Electric Co. backs its confidence in this pole changer by an offer to send it 30 days on trial.

Stromberg-Carlson Gets Government Contract.

The United States signal corps is doing some important telephone work under the personal direction of the new chief signal officer, Brigadier General George P. Scrivens. A contract has just been awarded the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., for one hundred U. S. army service buzzers, model of 1912. This ingenious set is for composite telephone and telegraph field service. It is the latest and most unique signaling device designed by the United States signal corps for use by the army and national guard. The latest model includes some additional features of practical value not furnished with other instruments formerly made by the Stromberg-Carlson company.

U. S. Army Service Buzzer Outfit.

Advance Introduction Cards.

An excellent means has been adopted by The M. W. Dutton Co., of Providence, R. I., of advising customers, who send in letters of inquiry, of the personal service which will be placed at their disposal. When these letters are received, cards similar to the one reproduced in the accompanying illustration are mailed.

These cards are 6 inches by 3½ inches in size, and each contains a reproduction of a photograph of the local sales manager of the company in the district from which the inquiry comes, together with the printed matter shown in the illustration. The use of the cards is not only a pleasing form of advance introduction, but acquaints the customer with a spirit of service on the part of the M. W. Dunton Co. that cannot help making a good impression on the customer who has sought the company's advice.

This will introduce
Mr. C. C. Davis
12th and FILBERT STS., PHILADELPHIA, PA.
Lippincott Building
TELEPHONE NUMBERS:
BELL-WALNUT 1741. KEYSTONE-RACE 1319.
Our Philadelphia Sales Manager, who will call on you shortly in reply to your inquiry of Tell Mr. Davis your soldering troubles — Maybe he can suggest a way out.
The M. W. DUNTON CO., Providence, R. I.
Mgr.
Manufacturers of Nokorode "The Perfect Soldering Flux."

The "Nokorode" Introduction Card of the M. W. Dunton Co.

The Fate of an Early Kansas Telephone Line.

Within a few weeks the Missouri & Kansas Telephone Co. will have a copper circuit telephone line completed from Wichita to Pratt. The building of this line, says the Wichita Eagle, recalls to L. F. Duggan, commercial division superintendent of the Bell company, the fate of a telephone line built from Wichita to the county seat of Pratt county back in the '80s.

The line was one of the first ever constructed in the southwest. The wires were heavy galvanized and the noise they made could be heard a long ways from the public highway along which they were strung. From Wichita the poles were set almost directly west, following closely the railway.

Soon after the line was built the Bell company brought suit against the owners, claiming that they had infringed on the Bell patent. The courts held that the Bell company was right and ordered the telephone line destroyed.

Poles were chopped down, burned up and many hauled away by farmers. The wire was cut down and court officers doing the job of destruction told the farmers to help themselves. One invitation was all that was needed. Many pastures were enclosed by telephone wire cut from the line, and to this day bits of the old wire can be seen on Pratt and Kingman county farms.

Paragraphs.

THE PARAGON SELLERS CO., Chicago, announces a transfer of its San Francisco stock to 440 Market street in charge of Paine, Bailey & Co., and its Los Angeles stock to 443 E. Third street, in care of F. F. Foster & Co., where there will be maintained full and complete stocks of Ironite Wire, Paragon Self Tying Knobs, Paragon Ground Cones, Paragon Handy Lamp Brackets and Paragon Battery Boxes. The company's facilities for the quick handling of orders will be greatly improved and the trade can depend upon prompt and careful attention being given to all shipments.

JOHN M. KLEIN, of Mathias Klein & Sons, of Chicago, has just returned from an extensive trip to the Pacific Coast. He is very optimistic over the conditions and looks forward to an exceptionally good spring and summer. About August 1, Mathias Klein & Sons will move into their large factory now being built at Belmont and Kedzie avenues, near the Avondale station on the Wisconsin Division of the Chicago & Northwestern R. R., where they will have better facilities for manufacturing Klein tools. Mr. Klein reports that the demand for Klein tools is so great that they are forced to move into larger quarters.

Report of Difficulty at Lemmon, S. D., Erroneous.

The report recently current regarding a controversy between the city council of Lemmon, S. D., and the telephone company of that city respecting the company's occupancy of the streets is found to be without foundation. The exchange at Lemmon, S. D., is owned by the Dakota & Montana Telephone Co. and the condition reported in some of the county newspapers does not exist there at this time.

Legal Cases and Decisions

By A. H. McMillan

Securing Right of Way.

"Can an Independent telephone company, having no charter, erect its lines along the highway running through a certain man's farm without securing a right of way?"

So far as the farmer is concerned, the fact that you have or have not a charter does not affect the question of your needing a right of way. You should have his permission, whether you have a charter or not. Of course so long as the farmer makes no objection, you can safely allow your line to remain in the highway through his farm. If he should object, he would be entitled to require you to move.

Refusing to Pay Over Time Charges.

"We have been furnishing exchange service and taking toll calls from our subscribers and adding the toll charges to their bill and collecting at the end of the month. We have one subscriber who has begun to refuse to pay any overtime charges. Upon his last refusal we told him we would take no more toll calls from his telephone and he would have to come to our pay station for his long distance service. We wish to know if we can make this stick. If we cannot, what recourse have we against him? Will he have recourse against us, if we stand by what we have told him?"

We think you have a right to require the subscriber to come to your pay station for his long distance service, or in some other way to pay cash in advance. We do not believe he would have any recourse against you.

Distance Between Electric Light and Telephone Wires.

"Do you know of any state or city law which compels an electric light or power company to place its wires at a certain distance from those of a telephone or telegraph company, so as not to interfere with them in any way, the wires of the latter companies having been put up first?"

There is no exact distance established by law to be maintained between electric light or power wires and telephone or telegraph wires. The general principle governing the matter is that the distance to be left between adjacent wires depends upon the two systems, taking into consideration all the facts and circumstances in each case.

The only general rule that can be laid down is that the distance must be such as to be safe and prevent interference between the wires under the circumstances of each case. We do not know what the local ordinances of the city where you are located may require. This is a matter for your local attorney.

The Compulsory Interchange of Toll Business.

"I desire to know if there has been a ruling in many of the states by public service commissions, regarding and compelling telephone companies to connect for the interchange of toll business, and any general information you may be able to give.

There has been in operation in this county, two telephone exchanges with connection with Bell telephone company's toll line. When the two Independent exchanges made connection with their own lines, the Bell company disconnected its toll lines and refused to connect unless local connection be severed."

The right of one telephone company to compel another to connect with it for the interchange of toll business depends upon the particular laws of each state. In general, common carriers have the right to compel connections with other like carriers, who are not competing. In states where telephone companies are declared by law to be common carriers, it is probable that the connection could be compelled before the public service commission.

Compulsory Physical Connection.

"Will you please furnish references or any other data at your disposal, of cases where Bell telephone companies have been compelled by courts to make physical connection to systems of Independent companies?"

The only case of this kind to which we can refer you is one arising under the constitution of Montana, that of the Billings Mutual Telephone Co. vs. Rocky Mountain Bell Telephone Co., U. S. Circuit Court, 1907. The general holdings are to the effect that physical connections between competing companies cannot be compelled. Ivanhoe Furnace Co. vs. Virginia & Tennessee Telephone Co., 63 Southeastern, 426.

The right of one public service company to use another's property, the two companies being a bridge company and an electric railway company, was discussed in the case of the Evansville Traction Co. vs. Henderson Bridge Co., 134 Federal, 973.

The general subject was discussed in State vs. Cadwallader, 87 Norheastern, 644. It was held that one telephone company could not be compelled to put a telephone in its rival's office in the case of the People vs. Central Telephone Co., 58 New York Supplement, 221. A connection contract was construed in the case of Campbellsville Telephone Co. vs. Lebanon Telephone Co., 80 Southwestern, 1114. See also the following cases:

Express cases 117 N. S., 1; 6 Sup. Ct., 542,628; Barney vs. Steamboat Co., 67 N. Y., 301; People vs. Hudson River Telephone Co., 19 Abb. (N. C.), 466; People vs. Central New York Telephone Co., 58 New York Supplement, 221; Chicago M. & St. P. Ry. Co. vs. Minn., 134 N. S., 418; 10 Sup. Ct., 462,702; Ry. Co. vs. Gill, 156 N. S., 649; 15 Sup. Ct., 484; Shepard vs. Telephone Co., 38 Hun., 338; Atl. C. L. R. Co. vs. N. C. Corp. Com. Adv. Sheets U. S. Ct. r. June 107, p. 585.

Avoiding the Free Telephone Law.

"We are now operating under the Oregon State Railroad Commission, which has jurisdiction over plants under a law that provides for no discrimination on an equal class of service. We have, as have most towns, a telephone in the engine roundhouse, which has, up to the present time, been free. This telephone is used to call the engineers and firemen, more than a hundred of whom have our telephones in their residences. Should we be forced to take this telephone out on account of refusal on the part of the railroad company to pay for it, we would doubtless lose the majority of the residence telephones of the firemen and engineers.

Can we in any way pay for this telephone ourselves on the basis that it is placed as a proper expense of operating our own business? Another thought, as to what pretext we would have for leaving it there, would be to place it as one of the telephones required by the city for the police department for detecting thieves, etc. In this case we could leave it free. Another way would be to advertise a rate of no charge for telephones in round houses where more than 150 firemen and engineers operate out of the round house, making this a rate to all round houses of this description. As a matter of fact there are no others of this size, but we would willingly and cheerfully put a telephone in any other, if there were any others, so there would be no discrimination.

We would like to have an opinion on the case."

We do not believe you could legally avoid the law in question in the case you mention by paying for the telephone yourselves. We do not know what arrangement you have with the city for free telephones and so cannot advise you as to whether the pretext you suggest, of placing it as one of the telephones required by the city, would do. The last pretext suggested, namely, of advertising a rate of no charge for telephones in round houses, etc., is the best suggestion, but we doubt whether this would succeed, because the law, requiring no discrimination in the price of the same class of service, refers to the service given by your telephone, not to the class of subscribers.

No Damages from Mental Suffering.

Where it was alleged that negligence of the telephone company in failing to answer a call for a physician caused the plaintiff hours of "intense suffering, which affected her general health, retarded her recovery, and caused her to fall into an illness from which she suffered and still suffers," it is held that no damages are asked for except for mental and physical suffering which the plaintiff endured during the time that the physician was delayed in coming. Hence, the suit could not be maintained. Southern Bell Telephone Co. vs. Reynolds, 77 Southeastern, 388.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personals.

W. B. SERVISS, of Owosso, has been appointed manager of the Valley Telephone Co., at Saginaw, Mich., to succeed J. J. Speed, resigned.

FRANK W. PLANE has resigned his position as manager of the Boone County Rural Telephone Co., at Belvidere, Ill. Arthur Orr will succeed him.

W. R. LOGAN, for several years manager of the Maryland Telephone Co.'s office at Elkton, Md., has been transferred to Havre de Grace, succeeding H. U. Case, resigned.

W. A. RAUCH recently tendered his resignation as manager of the Belle Fourche Rural Telephone Co., at Camp Crook, S. D. Harold Shelden will be his successor.

C. A. POFF, formerly commercial manager of the Mountain States Telephone & Telegraph Co., at Boise, Idaho, has been transferred to Ogden, Utah, where he occupies a similar position.

W. K. MCQUOWN, heretofore manager of the Union Telephone Co., of McKinney, Texas, has been appointed superintendent of the North Texas Telephone Co., with headquarters at Sherman, Texas.

HOTCHKISS YOUNG, of Brownsville, Tenn., has been appointed manager in charge of the business of the Cumberland Telephone & Telegraph Co. at Hickman, Ky., to succeed J. E. Campbell, resigned.

W. F. MCKEE, formerly manager of the Great Falls Automatic Telephone Co., at Great Falls, Mont., which was recently consolidated with the Bell company, has been appointed traveling representative of the Montana Independent Telephone Co., with headquarters at Butte.

CARL PETERSON, who has, for the past eight years, been connected with the New York Telephone Co., at Riverhead, N. Y., was recently married to Grace Magee, formerly operator for the Baiting Hollow & Roanoke Telephone Co., of the same place. The consolidation of the two companies has been much talked about and it is said the first steps of a merger were taken when these two were united.

New Companies.

WILMINGTON, DELA.—Articles of incorporation have been filed by the Central Home Telephone & Telegraph Co., with $50,000 capital stock. The incorporators are S. S. Adams, Jr., and others.

FORTVILLE, IND.—The John Bird Telephone Co. has been incorporated with $300 capital stock. The incorporators are: Chas. Springer, Everett Ogle and John Stokes.

WASHINGTON, IND.—The Farmers' Telephone Co. has been incorporated with $1,000 capital stock by the following: C. Q. Trueblood, N. L. Yoyles, L. N. Smith, Jr., Hiram Barrett and Charles Lukenbill.

BELMONT, KY.—The Belmont & Shepherdsville Telephone Co. has been organized with $225 capital stock. The incorporators are: J. W. Gaban, E. B. Triplett and I. T. Mudd.

UNION, KY.—Articles of incorporation have been filed by the Mutual Telephone Co. with $6,000 capital stock. The incorporators are: R. R. Houston, Noah Zimmerman, Ezra Tanner and W. H. Rice.

STOCKBRIDGE, MICH.—Articles of incorporation have been filed by the Stockbridge & Fitchburg Wayside Telephone Co. with $900 capital stock. The incorporators are: Geo. Springman, Milo S. Smith, S. O'Brien and others.

RICHWOOD, MINN.—The Richwood Farmers' Telephone Co. has been organized with $10,000 capital stock. The incorporators are: J. T. Shannon, president; H. W. Wilkins, vice-president; A. K. Gandand, secretary and treasurer.

CLOUDCROFT, NEW MEX.—The James Canon Telephone Co. has been organized here to construct a telephone line to Mayhill, New Mex., a distance of 20 miles. An exchange will also be established in Cloudcroft.

PORTERVILLE, N. Y.—The Porterville Telephone Co. has been organized by Edgar T. Caneen, L. J. Henry, A. D. Glover, B. T. Fairchild and others. L. J. Henry is secretary.

FT. SENECA, OHIO.—The Seneca Mutual Telephone Co. has been incorporated by E. S. Rosenberger and others.

LAMBERT, OKLA.—The Lambert Rural Telephone Co. has been organized with $4,500 capital stock. The incorporators are: J. A. Eaton, J. C. Bell and J. W. Mercer, all of Lambert.

RANKIN, OKLA.—Articles of incorporation have been filed by the Rankin Telephone Co. with $5,000 capital stock. The incorporators are: C. Y. Libby, G. H. Cox and Ira Walters.

TAHLEQUAH, OKLA.—The Meteory Telephone Co. has been incorporated with $1,000 capital stock by J. F. Thompson, Ross Donills and Louis Myers, all of Tahlequah.

STROUDSBERG, PA.—The Hunters Range Telephone Co. has been organized with $5,000 capital stock. J. M. Mack, Allentown, Pa., is one of the incorporators.

FRANKSTON, TEXAS.—The Frankston Telephone Co. has been incorporated with $4,500 capital stock, by M. E. Cook, S. G. Jones and J. H. Dragg.

LAKEVIEW, TEXAS.—Articles of incorporation have been filed by the Lakeview Telephone Co. with $1,000 capital stock. The incorporators are: I. W. Thomason, W. H. Youngblood and H. R. Mullins.

OLYMPIA, WASH.—The Lacey-Chambers Prairie Mutual Telephone Co. has been organized by the following: Walter Barnard, A. W. Robertson, G. W. Tyler and N. G. Reber, all of Olympia.

APPLETON, WIS.—The Five Corners Telephone Co. has been incorporated with a capital stock of $3,500. The incorporators are Albert Rohm, Barney Feistel and Albert Baehler.

AVOCA, WIS.—Articles of incorporation have been filed by the Avoca & Muscoda Farmers' Telephone Co. with $450 capital stock. The incorporators are H. Bock, W. Fessel, Henry Fleming and others.

PINE RIVER, WIS.—The Pine River Telephone Co. has been organized with officers as follows: President, Chas. Voege; secretary, A. P. Karau, and treasurer, John Grob.

Construction.

MT. STERLING, ILL.—The Mt. Sterling Telephone Co. has plans under way for the erection of a new two-story exchange building in this city.

NEVADA, IOWA.—The Story County Independent Telephone Co. is planning to make improvements to the local exchange in this city, to cost about $8,000.

IRONWOOD, MICH.—The Michigan State Telephone Co. has purchased a site and will erect a new two-story exchange building in this city.

FREDERICKSBURG, TEXAS.—The Martin Telephone Co. is preparing to install a telephone exchange in this city.

Elections.

CANTON, ILL.—Officers have been elected for the Canton Home Telephone Co. as follows: President, M. J. Gorman; vice-president, G. W. Chandler; secretary, F. W. Plattenberg; treasurer, W. D. Plattenberg, and manager, P. P. Anderson.

HILLSBORO, ILL.—It is reported that the Peoples' Mutual Telephone Co. plans to dispose of several of its lines to other companies, including the line to Mulberry Grove, the line to Alhambra, the line from Bayle City to Ramsey and the line to Harvel. The right to use these lines free of charge will be reserved.

MARSHALL, ILL.—The stockholders of the Farmers Mutual Telephone Co. have decided not to sell the company's lines but to repair all the city lines and continue business.

MCCONNELL, ILL.—The McConnell Telephone Co. held its annual meeting recently, at which the following officers and directors were elected for the ensuing year: President, Wm. Lawler; vice-president, John Shippy; secretary, A. S. Bechtold; treasurer, J. M. Stamm; directors, John Wagner, John Shippy, John Rockow, Henry Stabenow and William Lawler.

ONEIDA, ILL.—The Oneida Telephone Co. held its annual meeting recently and elected the following directors: A. J. Miller, G. L. Stephenson, W. T. Glenn, J. F. Epperson and F. C. Krans. The directors held a meeting and elected officers as follows: President, W. T. Glenn; vice-president, F. C. Krans; secretary, treasurer and manager, A. J. Miller.